TERM FIRST

Class 8th Tutorial

THE LEGENDS

SCHOOL OF EDUCATION

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Term Ist English Tutorial for class 8th

Topic1: Global Warming

Q) Why has the earth's surface temperature increased?

a) Human activities such as deforestation and burning of fossil fuels have led to increasing concentrations of greenhouse gases. This has caused the earth's average temperature to increase.

Q)Why the Himalayan region is called the tower of Asia?

a) The Himalayan region has a glacial coverage of 33, 000 sq. km- and provides around 86 million cubic-meter of water annually. Therefore, it is aptly called the 'Water tower of Asia".

Q) *What are the main sources of water in Kashmir valley?*

a) There are various sources of water in the Kashmir valley like the flood plain lakes, high altitude Himalayan lakes, perennial rivers of the Indus system, ponds, streams, springs, reservoirs etc. Besides these the Kolhai Glacier is the main source of drinking water and irrigation in the valley.

Q) *Why is water the most precious natural source?*

a) Water is the most precious natural source because it sustains and supports all kinds of life forms on this planet.If there is no water; there will be no life on earth.

Q)*How has Kashmir been influenced by global warming?*

A) In Kashmir, global warming has caused the glaciers to recede and reduction in snowfall which has resulted in water scarcity for irrigation and hydropower generation. Frequency of flooding has also increased. There is also an increase in the occurrence of high velocity storms which cause devastation to human life. Due to increasing temperatures, the demarcation between seasons isn't well defined now.

Q)*How is global warming the largest threat to humanity?*

a) Global warming has a very high impact on our environment as a whole. It has caused the receding of glaciers which provide water to rivers and streams and thus are very important for livelihood and

economy of millions of people. Global warming has also resulted in the increasing floods and high velocity storms which cause heavy devastation. It has also influenced the usual seasonal patterns due to which some migratory birds have changed their cycle. Thus global warming is largest threat to humanity.

Q. *What do you think is the cause of decreasing snowfall in Kashmir?*

a. Global warming is the cause of decrease in snowfall in Kashmir.

Q. *What has been the impact of global warming of J&K so far?*

a. Compared to other glacial regions in the world glaciers in Jammu and Kashmir are receding at a very alarming rate. In the last forty years we have lost 16% of glaciers in suri basin and Kolhai glacier.

Q. *What role do the scientist play in j$k to deal with the problem of global warming?*

a. In Jammu and Kashmir The Energy and Resources Institute (TERI) has selected the Kolhai glacier in the West Ziddar valley as one of the index glaciers for long term monitoring so that their scientists can assess the water resources availability to the communities in the valley. After five years of scientific studies conducted on the glacier TERI will recommend measures to bring down the glacier's recession rate.

Q. *What do we as individuals need to do to deal with the problem of global warming?*

a. We as individuals need to take certain steps in order to deal with problems for global warming. For Instance:-

i. Burning of fossil fuels should be limited to bring down level of greenhouse gases in the environment.

ii. We can use driving alternatives like cycling, walking, public transport and carpooling in order to save fuel

iii. We must replace high energy consuming gadgets by energy saying ones e.g. L.ED's and CFL’s instead of bulbs, geysers instead of water boiler.

iv. Awareness needs to be created about this issue through rallies seminars, magazines and newspapers etc.

Topic2: Rustum and Sohrab

Q1 Why was Rustum not able to live with his wile for a long time?

Ans. It was because the King of Persia called him back as he didn't feel sameunless he was in his kingdom to protect and defend it.

Q2 Why did Tanimeh send word to Rustum that their child was a daughter?

Ans. She sent a message to Rustum that their child was a daughter and not a son because if he had known that he had a son, he would-have certainlytaken him away and she would have been left all alone.

Q3 What secret did Sohrab learn from his mother?

Ans. Sohrab learnt that he was the son of Rustum, the shield of Persia.

Q4 What did Tanimeh want Sohrab to do when he met his father?

Ans. Tanimeh told him to show him the precious stone tied on his arm by which his father could easily recognize him.

Q5 Why did Rostum not tell Sohrab who he was?

Ans. Rustum didn't tell Sohrab who he was because he thought that the young man was trying to be clever and if he told him the truth, he might want to make peace with him and withdraw the fight.

Q6 Why was Rustum at first not ready to fight Sohrab?

Ans. He at first wasn't ready to fight Sohrab because he was old and had to look after his aged father.

Q7 How was Sohrab wounded?

Ans. Sohrab was wounded after hearing the war cry of Rustum. As a result of his war cry, he became nervous and dropped his shield and Rustum's sword pierced his body.

Q8 What was Sohrab's last words?

Ans. Sohrab's last words were that his body be carried to his father's home and buriedthere so that the people passing by his grave would say that it was Sohrab, the mighty Rustum's son who was killed by his father in ignorance.

TOPIC3: The Bangle Sellers

Central Idea: - The poem is a perfect epitome of typical Indian woman. It portrays the three stages in the life of an Indian woman viz, virgin, bride and middle aged

woman. The poet describes the hangings of an Indian woman who is carrying in her heart countless dreams of her future life.

Summary: - The poem entitled The Bangle Sellers has been pen locked by a famous Indian poet 'Sarojini Naidu'. It is a poem of four stanzas of six lines each. In this poem, the poet says that a group of bangle sellers is on its way to the temple fair to sell their bangles. .The Bangles are delicate, bright and colourful. The Bangle seller invites the people to *come* and buy the delicate, bright and multi-coloured bangles which are tokens (symbols) of delight for happy daughters who are looking forward to their marital blissand happy wives who are content in the fulfillment of their marital status.The Bangle Sellers gives an account of the bangles which are prepared for a maiden. They say that the silver and blue coloured bangles are suitable to a maiden.These are like the mist on the mountain in their colour. Further they say that they have bangles which are like buds on a woodland stream. Some are shining like flowers. All these bangles are suitable for the unmarried girls.

The poet says that the bangle sellers have some bangles which look like Como-fields. They are suitable for a bride on her bridal morning. Some bangles look like the flame of her marriage fire (red), some are rich with colours of her heart's derive. The bangles are shining and delicate as the bride at the time of her wedding. The bridal laughs as she is getting married and sheds tears as she is going to leave her parental-abode. The phrase bridal laughter and bridal tear suggest the emotional feelings of a bride.

In the last stanza, the poet says that the bangle sellers possess some bangles which are purple in colour and some are spotted with golden dots.All these bangles are suitable for middle aged women whose hands have cared tenderly, loved, blessed and cradled her sons and worshipped the gods sitting by her husband's side.

Q1. Who is the speaker in the poem?

Ans. The poetess Sarojni Naidu has represented bangle seller as the speaker in the poem.

Q2. How are the bangles described in the first stanza of the poem and who are these bangles for ?

Ans. In the first stanza,the poetess has described the bangles as the delicate,bright,rainbow tinted circles of light. The poetess further has described

them as the lustrous tokens of radiant lives i.e, the bright and shinning signs or symbols of the lives full of happiness. These bangles are for the daughters and wives whose lives are beautiful and full of hopes and happiness.

Q3. The poet uses different similes for the bangles. What are these?

Ans. The different similes that the poet has used for the bangles are;

1. Silver and blue as the mountain mist.
2. Some are flushed like the buds that dream.
3. Some are like fields of sunlit corn.
4. Some like the flame of her marriage fire.
5. Tinkling luminous tender and clear like her bridal laughter and bridal tear.

Q4. Name the different colours of bangles mentioned in the poem? What do these colours represent?

Ans. The different colours of bangles mentioned in the poem are;

Silver, blue, purple and grey. These colours represents the different stages of life.

Q5. The word 'some' has been repeated in the poem for a purpose. What is it?

Ans 'Some' has been used to create a poetic effect and it has also been used to emphasize the large variety of bangles.

Q6. Explain the following line

Some are made for a maiden's wrist
Silver and blue as the mountain mist.

Ans. In these lines the poetess says that some bangles are suitable and proper for the unmarried girls. The poetess says that silver and blue coloured bangles are usually preferred by the young girls in order to beautify themselves as the blue mountains are beautified by the silver coloured mist enveloping them.

Topic 4. BROOK

Central Idea: The poem appears to be a symbol of life. Various instances can be seen in the poem drawn parallel between brook and life .The poet personifies the brook and describes the various stages it undergoes.

Summary:''The Brook"is written by ALFRED TENNYSON. In this poem,poet makes the brook, narrates its history of origin and uneven journey through woods,valleys and open fields until it joins the brimming river. The brook originates from the dwelling place of wild water birds such as the coot and the hern. It makes a sudden rush as it flows out. The sunlight causes the brooks water to sparkle as it flows among the fern. It then continues its journey by flowing down a valley. While doing so, the sound of the flowing brook resembles with noise. The

brook repeats that human life is very short and comes to an end but the flow of the brook is continuous and goes on forever.The brook draws along with it several floating objects as it flows towards the river.The brook overflows upon the grass plots. They are a sign of faithfulness and love and hence are associated with lovers. The poem ends with the same refrain that the flow of the brook is continuous and goes on forever but human life is very short and comes to an end.

Topic 5.Prayer for strength

Central idea

The poem ‘’prayer for strength’’ has been written by ‘Rabindernath Tagore’ one of the famous personality of India and a well-known Indian English poet. In this poem the poet imploresGod to make his heart strong enough to bear joys and sorrows. He also prays to grant him the strength to help the poor. At last,he prays to his lord to give him strength to submit his whole being to his will.

Summary

The poem ‘prayer for strength’ has been pen locked by Rabindernath Tagore. In this poem the poet implores God to make his heart strong and submits his prayers to him. He asks God for strength to help him to bear the joys and sorrows of life. The poet prays to grant him the strength to help the poor and needy people. Towards the concluding lines,the poet wants to give him strength to submit his whole being to his will. So that he can spend his life in contentment and peace and achieve the highest glory i.e eternity.

Q1. Why does the poet want God to strike at his heart?

Ans. The poet wants God to strike at his heart in order to get enlightened. He implores God to make his heart strong enough to bear joys and sorrows.

Q2. What does the poet wants the strength for?

Ans. The poet is a philanthropist and wants the strength to help the poor and the needy.

Q3. How can love be meaningful in one’s life?

Ans. Love is essence of life. It can be made meaningful by helping the poor and needy.

Q4. What should be our attitude towards the poor?

Ans. Our attitude towards the poor should be that of a philanthropist and we should provide every help to them.

Q5. What does 'bend my knees' signify?
Ans. The phrase 'bend my knees' signify one's loss of honour and dignity. In this poem the poet implores the God to prevent him from bending his knees before insolent power, by providing him with enough strength.

Q6. Why does the poet want to raise his mind high above daily trifles?

Ans. The poet understands life very special gift of God. He doesn't want to spoil this gift by including trifles. Instead he asks for the strength that would make him think high and achieve great.

Q7. Why does the poet asks for strength to surrender his will to God's will?

Ans. The poet asks for strength to surrender his will to God's will because he has understood the deeper meaning of life. As such he wants to attain eternity. The surrender to god makes a person pure and pious.

1.LIFE

Q1) What answer did the stars give to the wind?
Ans: The stars answered that when there was no moon, it seemed to them as if they were released from captivity; because in the absence of moon they brightened up and every star felt that it had some power. They further said that the life of dependence was no life but to shine with one's own brightness was life to them.

Q2) What was the moon's reply to the wind?
Ans: The moon was very sad and called herself a lifeless entity because of the borrowed light. The moon blamed the borrowed light for its dark spots and said that it was like a shroud enveloping her dead body. The moon further compared her life with the laughter of a widow i. e the moon was very distressed and said that she was the child of ocean i.e her life was full of tears.

Q3) What was the ocean's response?
Ans: On hearing the question posed by the wind, the ocean gave a careful thought to it and said that his ideas of life was to realize one's limits and maintain one's dignity. The ocean further added that for him, life was to contain all bitter experiences, taking them as pearls and rubies. For him, life

was not to produce pearls and create clouds full of rain and thus called his life, a life of penance or renunciation.

Q4) What was the earth's reply to the question put forth to her by the wind?
Ans: The earth replied that for her, life was love. The earth said that the sprouts springing from her produced flowers and fruits. She further added that she stores the water that she gets from the clouds, rivers and streams and distributes among the thirsty. Thus, for her this giving and taking was true life.

Q5) What was the little girl doing when the wind saw her?
Ans: The little girl was lighting new lamps with the lamp that was alight, when the wind saw her.

Q6) Why was the wind impressed by the little girl?
Ans: When the wind enquired about the unlighted lamps, the girl said that they had no oil in them and there was no point in lighting them. The girl further said that she was lighting only those who yearned to awake and those who were longing to be lighted and said that she loved this play of life. Hearing this, the wind got impressed by the little girl.

Q7) Why did the wind join the little girl?
Ans: The wind was so much delighted that she forgot herself and joined the little girl.

2.PORUS AND HIS ELEPHANTS

Central Idea: - The poem has been written by "MARRY DOBSON". The poem is in the form of ballad (a poem or a song narrating a story in short stanzas)and highlights exemplary loyalty and faithfulness of an animal towards his master. The poet emphasizes that the animals can also express their emotions by crying and gasping just as human do by expressing themselves in words.

SUMMARY
The poem " PORUS AND HIS ELEPHANTS" is written in the form of ballad by Marry Dobson. In this ballad, poet narrates a story of a king and his elephant. It is a story of king Porus who went to fight against the army of Alexander the Great, in order to defend his nation. King Porus was on his elephant, fighting a

fierce battle against his enemies. Suddenly the king got wounded and fell down. The poet calls the elephant faithful beast as he played a gallant part in protecting his king against the attack of his enemies, stood as a wall and took all the arrows on itself and then lifted him against to a safe corner. In the end, the poet says that these animals may seem dumb to us but even they can love and show their feelings by crying and panting. King Porus was saved but his elephant died of its wounds. This story of the animals bravery and faithfulness became a legend for the people to remember.

Q1) How did the elephant saved the life of porus?
Ans: The elephant saved the life of Porus by sacrificing his life. He bravely fought against the Greek enemies and received all the wounds and injuries on itself, not allowing them to harm his master anymore.

Q2) What does the poet mean by : Ah! These dumb things that cry and pant, they too can love, for God made them so".
Ans: The poet explains in these lines that animals are dumb creatures but they too possess emotions like human beings. They love and are being loved. These animals express their love by crying and gasping just as humans do by expressing themselves in words.

Q3) What is the rhyme scheme of the poem?
Ans: The rhyme scheme of poem is abab.

Q4) The poem reflects the faithfulness of an elephant towards his master. Explain ?
Ans: This is a poem in which an elephant gives its life to save the life of its master. While king Porus was fighting on his elephant, it gave him strong support from beneath. When the king got wounded, the elephant stood over him & protected him against every harm. This animal sacrificed his life for his master and became an example of faithfulness.

3. ACHILLES
Q1) How was the Rose – Beetle man dressed?
Ans: Rose-Beetle man's dress was fantastic. On his head was a wide hat . His shirt and a startling blue satin cravat was worn round his neck . The pockets

of his coat were bulged. His patched trousers drooped over a pair of leather shoes with upturned toes.

Q2) How do we know that the Rose- beetle man cared well for his pets?
Ans: When Rose-beetle man undid a small sack of his shoulders, half a dozen tortoise tumbled out into the dusty road. Their shells had been polished with oil and he had decorated their front legs with little red bows. All this showed that he cared well for his pets.

Q3) What made the narrator select one particular tortoise from among the other animals?
Ans: When the narrator watched tortoise he was fascinated. The one that particularly took his fancy was the one with a shell of the size of a teacup. It seemed brighter than the others. Its eyes were bright and its walk was alert. All this made narrator to select this tortoise from among the other animals.

Q4) How did Achilies enjoy eating strawberries?
Ans: The fruit that Achillies liked the best was the wild strawberries. He would become hysterical at the mere sight of them. He would easily swallow the small sized strawberries, but if he was given a big one, he would grab it to a quite spot among the flower beds, where he would eat it at leisure.

Q5) How were Roger and Achillies Rivals?
Ans: Rager and Achillies were rivals because both of them were fond of grapes.

Q6) Why did Achillies find Roger irritating?
Ans: Achilles was very fond of grapes. When he ate grapes, the juice would run through his chin, and Roger would lie watching his mouth dropping saliva. Roger would creep upto Achilles and lick him vigorously to get the grape juice which irritated Achilles.

Q7) How did Roger feel at Achilles' funeral?
Ans: Roger felt very happy at Achille's funeral as the dog was wagging his tail through out the burial service.

Q8) The family wandered about the olive-groves, shouting ' Achilles….strawberries, Achilles…. At length , we found him.

a) How did Achilles escaped?

Ans: Achilles had escaped because the garden gate was left accidently open.

b) Explain why the family shouted 'strawberries' during their search.

Ans: The family shouted strawberries during their search because it was the fruit that Achilles liked the best. He used to become hysterical at the mere sight of them.

c) Where did the family finally find Achilles? What happened to him?

Ans: The family finally found Achilles dead in the well. He had fallen into the well, the wall of which had long since disintegrated.

Q9) There are many instances of humour in the story. Pick out any two of them.

Ans: Achilles is the story full of humour and fun. The character of Rose-beetle man is all the more humorous. His dress was fantastic which added to his funny appearance. Another humorous incident in the story is the licking of Achilles (the tortoise) by the dog (Roger) for the juice of grapes that dribbled down from his mouth.

Metals & Non-Metals

Physical Properties of Metals & Non-Metals.

1. Metals are generally solid in nature at room temperature except Mercury and Gallium which areliquid at room temperature.

Non-Metals can exist in all three states of matter generally they are present in solid and gaseous state at room temperature e.g. Hydrogen, O_2 etc exist in gaseous state, Iodine, carbon exists in solid state, Bromine in liquid state.

2.Hardness;-Metals are hard in nature. Hardness varies from one metal to another.

Non -Metals are very soft except Diamond which is a form of carbon and is very hard. Graphite another form of carbon is very soft in nature.

3.Lustre:-The shining property of metals is called metallic luster. Metals reflect about 99% of light ; falling on them that is why they appear shiny.

Non-metals are non- lustrous and are dull coloured except Graphite and Iodine.

4.Density:-Metals have high density while non-metals have low density except some elements.Lithium (metals) has very low density.

5.Melting & Boiling points:-Metals have high melting and boiling points because they are tightly(their molecules) packed so in order to break their boundaries high energy is required. Tungsten has highest melting and boiling point.

Non-metals have low melting and boiling point except Graphite which has high melting point. Silicon and Boron have high boiling points.

6.Malleability:-Metals are highly malleable e.g. Gold and Silver. Non -metals are non-malleable but i they are brittle because they break on hammering.

7.Ductility:-Metals are highly ductile e.g. Gold, Silver and Aluminium. Non Metals are non-ductile and break on stretching.

8.Tensile strength: Metals generally have tensile strength. They can be stretched to some degree without breaking except Zinc and Arsenic.

It is because of the most tensile strength of metals we use these in construction. Non-metals have low tensile strength.

***9.*Conductivity:-**Metals are good conductors of electricity because of the presence of free electrons in their last shell.

Silver is the best conductor of electricity followed by copper, gold, Tungsten. However, Iron, Mercury and Bromine are poor conductors of heat and electricity. Non-Metals are poor conductors of electricity except Graphite.

10.Sonorousity:-Metals produce sound on striking with hard object. Because of this property they are used in bells.

Non-metals are non-sonorous.

Chemical properties of metals and non-metals;

1. Reaction with 0_2 (air);

Metals react with 0_2 under different conditions and result in the formation of oxide. (Basic oxide).

Metal + O_2 → Metal oxide

Basic oxide

The oxide that turns red-litmus paper blue

E.g.Mg $+O_2$→MgO (Magnesium oxide)

Or on oxide which reacts with acid to form salt and water.

e.g. MgO + HCl→ $MgCl_2$ + H_2O

Salt Water

Examples of metals

Sodium (Na), Potassium (K), Calcium (Ca)

These react at room temperature.

Mg, Zinc →react on strong heating.

Iron, copper → react on prolonged heating.

Activity which shows that magnesium forms a basic oxide (MgO) on burning in air.

Magnesium is a metal. We will take a magnesium wire, hold it with a pair of tongs and heat it over a flame. Magnesium wire burns producing magnesium oxide. We will put this magnesium oxide in a boiling tube, then add a little water in the boiling tube and shake it. We will find that MgO dissolves in water partially. We will add some red litmus solution to the boiling tube and observe the change in colour. We will see that red litmus solution turns blue. This shows that MgO is basic in nature (because only basic substances turn red litmus to blue).

Rusting of iron

The reaction of iron metal with oxygen of air takes place in nature. During the rusting of iron, iron metal combines slowly with the O_2 of air in the presence of water (moisture) to form a compound called 'iron oxide'. This iron oxide is rust.

Iron + Oxygen + Water → Iron oxide (Fe)

O_2 H_2O Fe_2O_3(Rust)

(A basic oxide)

Activity to show that iron oxide is basic in nature

Take at spoonful of rust (from rusted object) in a test-tube, add a little of water and shake it well. In this wav, we will get a suspension of iron oxide in water. Test this suspension of iron

oxide with blue litmus paper'and red litmus paper one by one. We will find that the red litmus paper turns blue. This shows that iron-oxide is basic in nature.

Rusting of copper

When copper object is exposed to moist air for a long time, the copper reacts with H_2O, CO_2 and O_2 present in moist air to form a green-coating on the copper object. The green coating is a mixture of copper hydroxide (Cu (OH_2) and copper carbonate ($CuCO_3$) which is formed by the action of moist air on copper object.

$2Cu + H_2O + CO_2 + O_2 \rightarrow Cu(OH_2) + Cu(CO_3)$

Copper hydroxide Copper carbonate

Thus, when a copper vessel is exposed to moist air for a long time, it acquires a green coating on its surface. The mixture of copper hydroxide and copper carbonate which forms the green coating is commonly known as 'basic copper carbonate'. If we make a suspension of a little of green coating in water and test it with litmus paper, we will find that it turns red litmus paper to blue. This shows that the green coating formed on copper vessel is basic in nature. The formation of green coating of basic copper carbonate on surface ofcopper objects on exposure to moist air is called corrosion of copper.

Reaction of Non-Metal with O_2

When non-metals react with **O_2** they result in the formation of two types of oxides.

1. Acidic oxide —> turns blue litmus red.
2. Neutral oxides

E.g. $H_2 + 0_2 \rightarrow H_2O \rightarrow$ neutral oxide

E.g. when carbon is burnt in the sufficient supply of air it results in the formation of CO_2

$C + \mathbf{O_2 \rightarrow CO_2}$

When we dissolve CO_2 in water it results in the formation of carbonic acid.

$CO_2 + H_2O \rightarrow H_2CO_3$(Carbonic acid)

2. When carbon is burnt in insufficient supply of air it results in the formation of

$C + \mathbf{O_2 \rightarrow CO}$ **(carbon monoxide)**

E.g. Sulphur is made to react with O_2

$S + O_2 \rightarrow SO_2$(Sulphur dioxide). Then this SO_2 is dissolved in water.

$\mathbf{SO_2 + H_2O \rightarrow H_2SO_4}$(Sulphuric acid)

Activity which shows that sulphur forms an acidic oxide ($S0_2$) **on burning in air.**

Sulphur is a non-metal. We take a small amount of sulphur powder in a spoon and heat it over a flame. As-soon as sulphur starts burning with a blue flame, we introduce the spoon in a gas jar and allow the sulphur to burn inside the gas jar. Cover the jar with a lid to prevent the gas being formed from escaping. Sulphur burns in the air of gas jar to form sulphur dioxide. Remove the

spoon from the gas jar. Now, put some water in the gas jar, cover it with a lid and shake it to dissolve sulphur dioxide. Add some blue litmus solution to the gas jar. We will see blue litmus solution turns red. This shows that sulphur dioxide is acidic in nature.

- If an element forms a basic oxide then the element will be a metal.
- If an element forms an acidic oxide then the element will be a non-metal.

Reaction of metal with water

When metals react with water it result in the formation of metal-oxide, metal-hydroxide and H_2 gas.The intensity of reaction depends on reactivity of metal.

Metals react with water under four conditions:-

1. Some metals react with cold water.
2. Some metals react with hot/ boiling water.
3. Some metals react with steam.
4. Some metals do not react at all.

Reaction of metals with cold water

Some metals are highly reactive. So they react violently even with cold water. As they can replace hydrogen very quickly from H_2O in order to give H_2 gas and some other products. E.g. Na, Ca, K

$Na + |H_2O \rightarrow NaOH + H_2$

Sodium Sodium hydroxide $Ca + H_2O \rightarrow Ca(OH)_2 + H_2$

Calcium Calcium hydroxide

$K . + H_2O \rightarrow KOH + H_2$

Potassium Potassium hydroxide

Sodium, Ca and K are highly reactive. They can react with water, O_2 and other gases present in air. So if these are kept exposed to air, these will react with the various components of air and get spoiled. In order to preventtheir reaction which H_2O these are always stored in Kerosene.

Reaction of metals with boiling water

Some metals like magnesium and zinc are less reactive.

They can displace hydrogen from H_2O in the presence of boiling H_2O and form their oxides with theliberation of hydrogen gas.

$Mg + H_2O \rightarrow MgO + H_2$

Magnesium Magnesium oxide

$Zn + H_2O \rightarrow ZnO + H_2$

Zinc Zinc oxide

Reaction of metals with steam.

Some metals like Iron and Nickel are less reactive and can react slowly even with steam.

Iron doesn't react with H_2O under ordinary conditions. This reaction occurs only when steam is passed overred hot iron and the products are Ferric and Ferrous oxides along with the liberation of H_2 gas.

$3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$

Ferrous and ferric oxide:($FeO+Fe_2O_3$)

Some metals do not react at all:

Some metals like copper, silver and gold do not react at all.

$Cu + H_2O \rightarrow Cu_2O + H_2$

Reactivity of Sodium:-

We cut a small piece of Na metal carefully and dry it between the folds of a filter paper. This piece of Na metal is: placed in water filled in a beaker. We will find that the piece of Na metal starts moving in H_2O making of hissing sound due to formation of bubbles of a gas and reacts with H_2O. Soon the piece of Na catches fire. When the reaction stops, touch the beaker we will feel the beaker to be somewhat hot. This is because heat is produced in this reaction. If we test the solution with red and blue litmus paper one by one, we will find it turns red litmus blue. This shows that the solution formed is basic in nature.

Reaction of Non-metals with H_2O

Non-metals do not react with H_2O because;

1. They can't displace H_2 from H_2O.
2. They do not donate electrons.

Some non-metals are highly reactive in nature e.g. phosphorous.

1.Why is sodium stored in Kerosene?

Ans. Sodium is extremely reactive metal. It oxidizes rapidly in air and reacts violently with water. Kerosene prevents the sodium from coming in contact with air, H_2O or other substances that might oxidize it. Besides, Kerosene does not allow the moisture to penetrate through it. We can store them in mineral oils.

2.Why do we store highly reactive metals in mineral oils?

Ans. We store highly reactive metals in mineral oils so that it can't absorb H_2O readily or react with air.

3.Why is phosphorous stored in H_2O?

Ans. Phosphorous is stored in H_2O because it will ignite on contact with air to give dense white fumes. Besides, it is insoluble in H_2O.

$P_4 + 5O_2 \rightarrow P_4O_{10}$

Reaction of metals with acids:-

Metals that can displace H_2 from water can react with dilute acids and result in the formation of salt and H_2 gas.

E.g. Na, Fe, Zn, Mg:- These are highly reactive metals and can displace H_2 from HC1 and H_2SO_4 acid and form their respective chlorides and sulphates.

$Na + HCl \rightarrow NaCl + H_2$

Sodium Sodium chloride Hydrogen gas

$Fe + H_2SO_4 \rightarrow FeSO_4 + H_2$

Iron Sulphuric acid Iron sulphate Hydrogen gas

$Zn + HC1 \rightarrow ZnCl_2 + H_2$

Zinc Hydrochloric acid Zinc chloride Hydrogen gas

$Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$

Magnesium Magnesiumsulphate

Metals like Cu, Gold, Silver are noble gas metals they don't react at all.

Reaction of Non-metals with acids

Non-metals do not react with acids because they can't displace H_2 from acids.

But some metals like sulphur react with hot and concentrated nitric acid but no H_2 gas is produced.

$S + HNO_3 \rightarrow SO_2 + NO_2 + H_2O.$

Sulphur Nitric acid Sulphur dioxide Nitrogen dioxide

The reactions of metals with acids have some important applications in our daily life. Certain foodstuffs like citric fruit juices, pickles contain acids, when they are kept in iron or copper containers. The acids present in them react with the metal of the container slowly to form toxic salts.

Reaction of metals with bases

Some metals do not react with bases, except Al, Zn, Pb are metals which react with strong bases to form saltand H_2 gas.

$NaOH + Al \rightarrow (NaAlO_2) + H_2$

Sodium hydroxide Sodium alummate

Non-metals do not react with bases if some of them will react with bases no H_2 gas will be produced only salt is formed.

Reactivity series of metals

Some metals are chemically very reactive whereas other metals are less reactive or unreactive. On the basis of vigour of reaction of various metals with O_2, H_2O and acids. The metals have been arranged in a group of series according to their chemical re-activities. The arrangement of metals in a vertical column in the order of decreasing re-activities is called reactivity/ activity

series of metals. In this series the most reactive metal is placed at the top whereas the least reactive metals is placed at the bottom.

Potassium (K) ---------- Most reactive metal
Sodium (Na)
Calcium (Ca)
Magnesium (Mg)
Aluminium (Al)
Zinc (Zn)
Iron (Fe)
Lead (Pb)
Copper (Cu)
Silver (Ag)
Gold (Au) ----------Least reactive metal

Displacement reaction

A reaction in which a highly reactive metal displaces a less reactive metal from its salt solution is called displacement reaction. E.g. Displacement of copper from $CuSO_4$ by reactive metal likes iron and zinc.

$CuS0_4 + Fe \rightarrow FeSO_4 + Cu.$

1. Displacement of silver from silver nitrate ($AgNO_3$) by copper metal.

$2AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2Ag$

Non- Metals

In non-metals as well more reactive non-metal displaces a less reactive non-metals from its salt solution. This is observed in Halogen family in which

F>Cl>Br>I

E.g.KBr + Cl -» KC1 + Br

Pot. Bromide + ChlorinePot. Chloride + Bromine

Uses of metals

1 Copper and aluminium are used to make wires to conduct electricity.

2. Iron, copper and aluminium metals are used to make cooking utensils and water boils for factories.

3.Aluminiumfoils are used for packing medicines, chocolates, food items and many other materials.

4. Aluminiummetal is used to make aeroplanes.

5.Mercury is used for making thermometers.

6. Silver and gold are used to make jewellers and ornaments.

7. Iron is used to make nails, screw, pipes etc.
8. Iron is the constituent of haemoglobin and magnesium is a constituent of chlorophyll.
9. Tin is used for making utensils and electric fuse wires.
10. Zn is used for galvanizing iron to protect it from rusting.
11. Lead is used for making water pipes, bullets etc.
12. Gold and silver Amalgam are used for filling tooth cavities.

Uses of Non-Metals

1. Phosphorous is used in manufacturing of fertilizers matchsticks, rat poison, alloy etc.
2. Sulphur is used for making plastics, synthetic, fibres, dyes, explosives, drugs, vulcanization of I rubber, fertilizers , germicides etc.
3. Powdered graphite is used as a dry lubricant. It is used for making graphite electrodes in dry cells. It is also used for making core of pencils called pencil leads.
4. Sand (silica) is used for making glass and cement.
5. N_2 is used for manufacturing Ammonia, HNO_3 etc.
6. Silicon is used for making silicon steel alloy.
7. H2 is used as a fuel for making ammonia, hydrochloride acids and vegetable ghee.
8. Cl is used for bleaching and sterilizing HbO.
9. Iodine is used for making iodized salts and tincture iodine.
10. O_2 is used for respiration and combination.

Textual Questions

Do Q1, Q2, Q3 and Q4 yourself.

Q5) -Some properties are listed in the following table. Distinguish between metals and non-metals onthe basis of these properties

Properties	**Metals**	**Non-metals**
Appearance Hardness Malleability Ductility Heat conduction Conduction of electricity		
Properties	**Metals**	**Non-metals**
Appearance Hardness Malleability Ductility	Have metallic luster Hard Malleable Ductile	Non-metals are dull Soft Not malleable Not ductile

Heat conduction Conduction of electricity	Good conductor Good conductors	Bad conductor Bad conductor/insulator

Q6 Give reasons for the following:

a)Aluminium foils are used to wrap food items

AnsAluminium is highly malleable metal and it is very easy to make aluminium foil in comparison to other metals

b)Immersion rods for heating liquids are made up of metallic Substances

Ans. Immersion rods are made up of metallic substances because metals are good conductors of heat and electricity

c)Copper cannot displace zinc from its salt solution.

Ans Copper cannot displace zinc from its solution because zinc is more reactive than copper.

d)Sodium and potassium are stored in kerosene.

Ans. Sodium and potassium metals are very reactive because they react with oxygen and water easily. A lot of heat is produced in the reaction, so sodium and potassium are always stored in kerosene.

Q7 **Can you store lemon pickle in aluminium utensils? Explain.**

Ans. No this is because lemon juice contains acid which can react with aluminium and make it harmful for human consumption.

Do Q8 yourself.

Q9 What happens when

(a)Dilute sulphuric acid is poured on a copper plate?

Ans. Copper sulphate is formed and hydrogen gas is liberated.

Copper + Sulphuric acid →Copper sulphate + Hydrogen (gas)

(b)Iron nails are placed in copper sulphate solution?

Ans Brown coating is deposited on the iron nails. This is because of displacement of copper from copper sulphate solution by iron.

Iron + Copper sulphate (solution)→Iron sulphate(solution)+Copper.

Q10 Sarish took a piece of burning charcoal and collected the gas evolved in a test tube

i) How will she find the nature of the gas?

She will bring a wet litmus paper in contact with the gas. If the gas turns wet blue litmus paper Into red, the gas will be acidic.

ii) Write down word equations of all the reactions taking place in this process.

- Carbon + Oxygen →Carbon dioxide.
- Carbon dioxide + Water→Carbonic acid.

Qll One day Reeta went to a jeweller's shop with her mother. Her mother gave an old gold jewellery to -the goldsmith to polish. Next **day when they brought the jewellery back, they found that there was a slight loss in its weight. Can you suggest a reason for the loss in weight?**

Ans The jewellers dip the jewellery in the solution of acid, which reacts with the outer covering of metals.Thus there is a net loss of weight in the metal of the ornament.

Q12 Why is phosphorus stored in water?

Ans Phosphorus is a very reactive non-metal. It catches fire if exposed to air so, in order to prevent contact of phosphorus with atmospheric oxygen, it is stored in water.

Q13 Why sodium metal is stored in kerosene?

Ans Sodium metal is very reactive. It reacts vigorously with oxygen and water. Alot of heat is generatedin the reaction. It is therefore, stored in kerosene

ADDITIONAL IMPORTANT QUESTIONS

Ql Name some metalloids.

AnsArsenic,antimony,silicon and germanium.

Q2 **Why is aluminium used in making airplanes?**

AnsAluminium mixed with other metals gives a hard substances with a low density and is,therefore,very suitable in making airplanes.

Q3 How much light is reflected back by mirrors coated with silver?

Ans 90%

Q4 **What are coinage metals?**

Ans Metals that are used for making coins are called coinage metals. Copper, nickel, zinc etc. are coinagemetals. Nowadays coins are made from suitable combinations of these metals.

Q5 **Why does an aluminium vessel loose its shine so soon after use?**

AnsAluminium is a reactive metal. As it comes in contact with air, it forms a dull layer of aluminium oxide onits surface hence looses its shine.

Q6 Silver does not combine easily with oxygen but silver jewellery tarnishes after sometime. Why?

Ans Silver does not combine with oxygen easily but jewellery exposed to atmosphere tarnishes aftersometime because it reacts with gases like hydrogen sulphide in air to from silver sulphide which is black.

Q7 **Talking the example of magnesium and sulphur explain how metals and non-metals produceoxides with different characteristics.**

Ans i) Magnesium is metal.lt burns in oxygen to produce basic magnesium oxide. MgO. When it is added towater, it produces a magnesium hydroxide which turns red litmus solution blue.

$2MgO \rightarrow 2MgO$

$MgO + H_2O \rightarrow Mg(OH)_2$

ii) Sulphur is a non-metal. With oxygen, it forms acidic oxide,SO_2. It gets changed into sulphurousacid,H_2SO3 on reacting with water. This turns blue litmus solution red. Red litmus solution remainsunaffected.

$S + 0_2 \rightarrow S0_2$

$SO_2 + H_2O \rightarrow H_2SO_3$

Q8 Give reasons for the following:

- Silver is used in making mirrors.
- Aluminium is used to make electrical wires.
- Foodstuffs with acid components should not be stored in aluminium utensils.
- Iron is used in constructing bridges and houses.
- Graphite is used as an electrode in the dry cell.
- Iron sheets are galvanized before use.

Ans

i. Silver has a high reflecting power.
ii. Aluminium is a good conductor of electricity.
iii. Acids react with aluminium.
iv.Iron is a hard, strong and rigid metal.
v. Graphite is a good conductor of electricity.
vi. Iron on exposure to atmosphere gets rusted.

OBJECTIVE TYPE QUESTIONS

- Noble gases are found in(free state/compound forms).
- Non-metals are generally (malleable/brittle).
- Potassium after combustion will form (acidic oxide/basic oxide).
- (Iodine/bromine) has antiseptic properties.
- German silver has (copper/silver)as major constituent.

TRUE OR FALSE

- Sodium is more reactive than magnesium. T
- Magnesium reacts with cold water. F
- All metals exist in solid form at room temperature. F
- Gallium has a low melting point. T
- Gold is alloyed with copper to make it hard. T.

Topic:Reaching the age of Adolescence

Puberty:-The age at which the sex hormones and gametes begin to be produced and boys and girlsbecome sexually mature. Generally boys attain puberty at the ageof 14 to15 years while girls reachpuberty at a comparatively lower age of 11-12 years.

Changes at puberty

The following changes start taking place in the body of boys and girls

*Increase in height***:-**There is a sudden increase in the height of both boys and girls during puberty.This occurs due to the increase in the length of arms and legs. The rate of growth in height variesfrom person to person. Some may grow rapidly at the start of puberty and then slow down whereasothers may grow gradually.The height of an individual depends on the genes which are inherited from parents. During growthperiod one should take nutritive food for the proper growth of muscles, bones and other parts of thebody.

*Change in body shape***:-**The change occurring in adolescent boys and girls is different. In girls pubic region widens and limbs become broader. Deposition of fat takes place around the hips, face and shoulders. In boys, shoulders become broader and the body muscles grow more than that ofgirls.

Change in voice:- At puberty, the voice box begins to grow. The larynx in boys is larger than that ingirls. The voice box can be seen as the Adam's apple in their throat. In girls, it is hardly visiblebecause of their small size.In boys, voice becomes deep and harsh whereas girls have high pitched voice.

*Increased activity of sweat and sebaceous glands:-*The secretion of sweat glands and sebaceous glands (oil glands) increases during puberty. This causes acne and pimples on the face of boys and girls at this time.

*Development of sex organs***:-**The reproductive organs in boys and girls become fully functional at puberty.

In boys, the male sex organs like testes and penis develop completely. The testes start producingsperms.

In girls, the ovary enlarges and eggs begin to mature. Ovaries start releasing matured eggs.Onlyone egg is released per month.

Production of hormones:-At puberty testes and ovaries start producing sex hormones, Testes produce the male sex hormone called testosterone and the ovaries produce the female sex hormone called estrogen. The sex hormones play an important role in the process of reproduction and in the development of secondary sexual characters.

Reaching mental, intellectual and emotional maturity:-Adolescence is a period of change in a person's way of thinking. They become more independent and self conscious, intellectual development takes place and they spend considerable time on thinking, planning, analyzing, evaluating, exchanging views and ideas with others. They need the company of friends and get attracted towards opposite sex.

During Adolescence stage, young people undergo a period of emotional changes. They may feel depressed and have mood swings and low confidence. They may experience various moods such as

being happy, sad. anger, excited or irritated. They think they need a greater degree of freedom, independence and privacy. These are the major causes of mental stress and they start feeling insecure.

Secondary Sexual Characters in Humans:

There are two types of sexual characters in humans:

1) Primary sexual characters 2) Secondary sexual characters

Primary sexual characters are those characters which are present at birth. These include internaland external sex organs which are present in babies at the time of their birth. The primary sexual characters in males are testes, penis etc and the primary sexual characters in females are ovaries, oviducts, uterus, vagina. The primary sexual characters are directly involved in reproduction. Secondary sexual characters are enrolled by hormones and distinguish between sexually matured males and females, but are not directly involved in reproduction. In secondary sexual characteristics the body parts develop special features which make it easier to distinguish boy from a girl.e.g. growth of facial hair in boys and development of breasts in girls are the secondary sexual characterswhich help to distinguish a girl from a boy.

The secondary sexual characters start developing at the time of puberty and continue to developthrough the period of adolescence.

The main secondary sexual characters in males are as follows:

1. Facial hairs such as beards and mustaches develop.
2. Hairdevelop under the armpits, on chest and in the pubic region.
3. Voice becomes deeper
4. Muscles develop and shoulders become broader.
5. Increase in weight.
6. Adam's Apple develops in front of throat.The secondary sexual characteristics in boys/ males are produced by the male sex hormonecalled testosterone.

The main secondary sexual characters in females are as follows:-

1. Development and enlargement of breasts.
2. Hairs develop under arm pits, and in the pubic region.
3. Hips become broader and become more curved and prominent.
4. Pubic region widens.
5. Initiation of menstrual cycle.
6. Deposition of fat on face, shoulders and around hips.
7. High pitched voice/shrill voice.

The secondary sexual characters in girls are produced by a female sex hormone called estrogen.

Endocrine System

1. Hormones:-These are the chemical substances which co-ordinate the activities of living organismsand also controls their growth, development and behaviour. Hormones are made and secreted by specialized tissues in the body called as endocrine glands. They are poured directly into the

bloodthroughout the body by the circulatory system. The hormones produced by the endocrine glands may act at a particular sight or target sight which contains receptors on it. The hormones involved in the development and control of reproductive organs and secondary sexual characteristics arecalled as sex hormones. The common sex hormones are testosterone, estrogen and progesterone.

Glands

A gland is a structure which secretes a specific substance in the body. It is made up of group of cells or tissues.

Types of glands

There are three types of glands mainly:-

Exocrine glands: 2. Endocrine glands 3. Heterocrine glands

Exocrine gland:-A gland which secretes its secretions through a duct or a tube is called exocrine gland e.g. salivary glands, sebaceous glands and sweat glands. These are also called as duct glands.

Endocrine glands:-These are the glands which pour their secretions directly into the blood and do not have ducts are called endocrine glands or ductless glands. They make and secrete some chemical substances e.g. Thyroid glands, Adrenal gland etc.

Heterocrine gland:-A gland which has both endocrine as well as exocrine part in it is called a heterocrine gland e.g. Pancreas.

The Exocrine part of pancreas produce pancreatic juice and the endocrine part secretes insulin and glycogen.

Important Endocrine glands:

*Pituitary gland:-*It is located just below the brain. It is called the master gland because many of the hormones which it secretes control the functioning of other endocrine glands in the body. E.g. Pituitary gland secrete hormones that make other endocrine glands such as Thyroid gland, Adrenal gland etc to secrete their hormones. It is divided into three lobes.

1) Anterior lobe 2) Intermediate lobe 3) Posterior lobe

Anterior lobe secretes six hormones. Intermediate lobe secretes I hormones and Posterior lobe secretes two hormones. It secretes a number of hormones. Growth hormone is one of them which secreted by the Anterior lobe of pituitary gland. The function of growth hormone is to control the development of bones and muscles.

Disorders

Dwarfism:-It is the disorder which is caused due to less secretions of growth hormones. In this, aperson remains short.

Gigantism:-It is the disorder which is caused due to more secretion of growth hormones, in this, a person remains very tall.

ThyroidGland:It is located in the throat region. It is largest endocrine gland. It secretes three hormones, T_3, T_4, thyroxine. The function of thyroxine hormone is to control the role of metabolism, growth and respiration.

The deficiency of thyroxine hormones in children slows down growth and mental development andthis is known as cretinism. Its deficiency in adults cause a disease called goitre. Too much of thyroxinehormones increases the rate of growth, metabolism and respiration, thereby makes the person to lose weight.

Over secretion of this hormone is called hyper secretion and its less secretion is called hypo secretion which respectively causes hyper-thyriodism and hypo-thyriodism.

Pancreas:-Pancreas are just located below the stomach in the body. It is heterocrine gland. Its endocrine part secretes 2 hormones, insulin and glucagon. The function of insulin is to control the sugar metabolism in the body. .

Deficiency of insulin in the body causes a disease known as diabetes milletus.

The endocrine part of pancreas secretes pancreatic juice which is used in the process of digestion.

Adrenal gland*:*These are two in no. and are located on the top of two kidneys. Adrenal gland secretes adrenalinhormone. This hormone is produced under stress. It regulates heart beat, breathing rate, blood pressure,carbohydrate metabolism and universal balance. The adrenaline hormones prepares our body to function at maximum efficiency during emergency situations like danger, fear shock, surprise, anger orexcitement. So, adrenalin hormone is also called as emergency hormone. Adrenal gland also producesand secretes another hormone called aldosterone. This hormone maintains the correct salt balance in the body.

Testes and Ovaries.

Testes produce testosterone and the function of testosterone is to promote sperm production and development of secondary sex characters.

Ovaries produce estrogen and its function is to promote egg formation and development of secondary sex characters. .

Reproductive phase of life in humans:

Adolescents become capable of reproduction at puberty when their testes and ovaries begin to produce gametes. Adolescent boys grow and become men and adolescent girls grow and become women. Inmen, the capacity to produce sperms usually lasts throughout the life but in women the capacity toproduce ovum lasts only upto 45-50 yrs of age.In females, the reproductive phase of life begins at puberty and generally continues till they reach the age of approximately 45-50 years.

With the onset of puberty, the ovum or egg begins to mature. One matured egg is released by one of the ovaries of women once in about 20-30 days. During this period, the inner lining of uterus grows and becomes thick and spongy and prepares itself to receive the fertilized egg. So incase fertilization occursthe fertilized egg cell begins to divide to form an embryo. The Embryo then gets embedded in the thickuterus living. This results in pregnancy which ultimately leads to the birth of a child. If the

ovum doesn't get fertilized then the thick and soft inner-lining of uterus along with the blood and unfertilized ovum are discharged out of the vagina. This flow of blood and other materials is termed as menstruation which continues for 3-5 days. Women of reproductive age undergo this periodical release of eggs from the ovary every month. The first menstrual from begins at puberty and is called menarche. This cycle of menstruation is repeated in a woman after every 28-30 days till an ovum gets fertilized.Menstruation stops when an ovum gets fertilized and women become pregnant.

The age at which menstruation stops and a women loses her ability to bear children is called menopause. It occurs in women around the age of 45-50 years. The whole menstrual cycle is controlled byestrogen hormone.

*Sex chromosome:*Chromosomes are present inside the nucleus of every cell of human body. All the human beings have 23pairs of chromosomes in the nuclei of their normal body cells. Out of these 22 pairs of chromosomes arecalled autosomes while the remaining 1 pair of chromosome is called sex-chromosomes. The twosex chromosomes are named xchromosome and y chromosome. A female has only x chromosome in all hergametes i.e. ova. And male has x chromosome as well as y chromosome in male gametes called sperms. Actually half the sperms have x chromosome and the other half of sperms have y chromosomes. Thegametes are not normal body cells but they are special cells called reproductive cells and each gamete contains only 23 single chromosomes.

Determination of the sex of a baby

The sex of a baby is determined by the type of sex-chromosomes present in the fertilized eggor zygotefrom which the baby develops. This will become clearer from the following discussion.

If a sperm carrying x chromosome fertilizes an egg which carries x chromosome then the zygote formed will have xx combination of sex chromosomes due to which the child born will be a girl.

If a sperm carrying y chromosomes fertilizes an egg which carries x chromosome then the zygoteformed will have xy combination of sex chromosomes due to which the child born will be a boy/male.

Thusthe sex of unborn child depends on whether the zygote formed at the time of fertilization has xx combination or xy combination of sex chromosomes. Traditionally it is believed that a mother is responsible for the sex of a child but as we can see from the above discussion it is the sex chromosomein the sperm that determines the sex of a baby. Therefore, it is the father who is responsible for a male or female child not the mother.

Reproductive health: Reproductive health is defined as a state of physical, mental and social well being of a person in allmatters relating to the reproductive system at all stages of life. The important conditions to maintain good reproductive health during adolescence are as under;

1. To eat balanced diet.
2. To maintain personal hygiene.
3. To take adequate physical exercise.
4. To avoid taking any drugs.

1. *Nutritional needs for adolescents:-* The diet of adolescents should be a balanced diet which shouldinclude food items made from cereals, which provide carbohydrates for energy. It should also include fats for giving energy. It should also include food items containing proteins, vitamins and minerals which are required for the growth of body and keeping good health.
2. *Personal hygiene for adolescents:-*The maintenance of personal hygiene is necessary for adolescents for preventing diseases and keeping good health. Adolescent boys and girls should take bath regularly. It removes sweat oil and dirt and cleans the body. Adolescent girls should take special care of cleanliness during the time of menstrual flow.
3. *Physical exercise for adolescents:*Adolescents should do physical exercise such as brisk walking, cycling, playing outdoor games etc. it keeps their body fresh, improves mental health, protects a person from heart disease, high blood pressure, diabetes and obesity. It improves one's efficiency in studies, sports and work and it also improves the general sense of well being and makes a person feel happier.
4. *No drugs for adolescents:-* Drugs are the chemical substances which when taken into the body changes the functions of the body, influence the mind and sometimes even change the behaviour of aperson.

   Adolescents should avoid taking drugs at any cost as there are many harmful effects of taking drugs.And some of the harmful effects of taking drugs are:-

a) Drugs are addictive.
b) Drugs addicts become irritable and lose interest in their studies and jobs.
c) Drugs can do physical harm to the body. i.e. it can damage brain, liver , kidneys and lungs.
d) Drugs increase the risk of accidents.
e) The sharing of syringes for injecting drugs spreads AIDS among the drug addicts.

Role of Hormones in completing the life history of frogs and insects:

In a frog, the tadpole or larva hatched from the egg passes through certain stages to become a frog. The change from tadpole to adult frog is called Metamorphosis. In a frog metamorphosis is brought about by the thyroxine hormone produced by the thyroid gland. The production of thyroxine hormone requires the presence of iodine in water. All the amphibians need thyroxin hormone to undergometamorphosis and change from larva into adult.

Similarly all the insects undergo metamorphosis to change from larva into adult. And the process of metamorphosis in insects is controlled by insect hormones which are made in their endocrine glands.

Textual Questions

1. *What is the term used for secretions of endocrine glands responsible for changes taking place in the body?*

a. Hormones

2. *Define adolescence.*

a. The period of life, when the body undergoes changes, leading to reproductive maturity is called adolescence.

3. *What is menstruation? Explain.*

a. Infemales the ova begins to mature with the on-set of puberty. One ovum matures and is released by'the ovaries once in about 28 to 30 days. During this period, the wall of the uterus becomes thick so as to receive the egg, in case it is fertilized and begins to develop. This is known as pregnancy. If fertilization does not occur, the unfertilized egg, and the thickened lining of the uteruswith its blood vessels are shed off. This causes bleeding in women which is called menstruation.

4. *List changes in the body that take place at puberty.*

a. The changes in the body that take place at puberty are:

i. Increase in height.
ii. Change in body shape.
iii. Change in voice.
iv. Increased activity of sweat and sebaceous glands.
v. Development of sex organs.
vi. Production of hormones.
vii. Reaching mental, intellectual and emotional maturity.

5. *What are sex hormones? Why are they named so? State their function.*

Sex hormones are the hormones that are produced by sex organs i.e. Testes and ovaries.

The testes produce the male sex hormone called testosterone and the ovaries produce the sex hormone called estrogen.

Functionof testosterone is to promote sperm production and help in the development of secondary characters and the function of ovaries is to promote egg formation and help in the development of secondary sexual characters.

6. *Choosethe correct option:* Do it yourself

7. Write notes on:

a)Adam's apple

b)Secondary sexual characters

c)Sex determination in the unborn baby

a) *Adam's Apple***:-**This is the protruding part of the throat in boys which begins to grow at puberty. This is also known as larynx or voice box.

b) Refer to page 2

c) *Sex determination in the unborn baby***:** - All human beings have 23 pairs of chromosomes as the name X and Y, female has two X chromosomes and male has one X and one Y chromosome.. When a sperm containing X chromosome fertilizes the egg, the zygote will have two X chromosomes and will

develop into a female child. If the sperm contributes a Y chromosome to the egg (ovum) al fertilization, the zygote will develop into a male child.

Sound

Sound: Sound is a formof energy which produces a sensation of hearing in our ears. Sound is produced when objects vibrate. We hear sounds from various sources like humans, birds, machines,television etc. Sound travels in the form of waves

PROPAGATIONOF SOUND: Sound is produced by vibrating objects. The matter or substance throughwhich sound is transmitted is called medium. It can be solid, liquid or a gas. When an object vibrates, it sets the particles of the medium around it vibrating. As a result, the adjacent particle gets displaced from its position. A series of compressions and refractions are set up in the air and sound is propagated through the air. When these compressions and rarefactions reach the ear drum, it vibrates and we hear the sound.

Wave: A wave is a vibratory disturbance in a medium which carries energy from one point to another. When a wave passes through a medium, the medium itself does not move along the direction of the wave, only the particles of the medium vibrate about their positions. Thereare two types of waves namely:

Longitudinal waves and Transverse waves.

NATURE OF SOUND: Sound travels in the form of waves. Sound waves are longitudinal waves.

Longitudinal WAVES: A wave in which the particles of the medium vibrate back and forth in the same direction in which the wave is moving called a longitudinal wave. The direction of vibration of the particles is parallel to the direction of wave. Longitudinal waves can be produced in solids, liquids and gases. The wave produced by compressingspring is an example of longitudinal wave.

A longitudinal wave travels through a medium forming compressions and rarefactions. A**compression**is a region of the medium in which particles are compressed i.e. particles come closer. A **rarefaction** is a region of the medium in which particles are rarefied i.e. particles get farther apart than their normal distance compression is indicated by C and rarefaction by R.

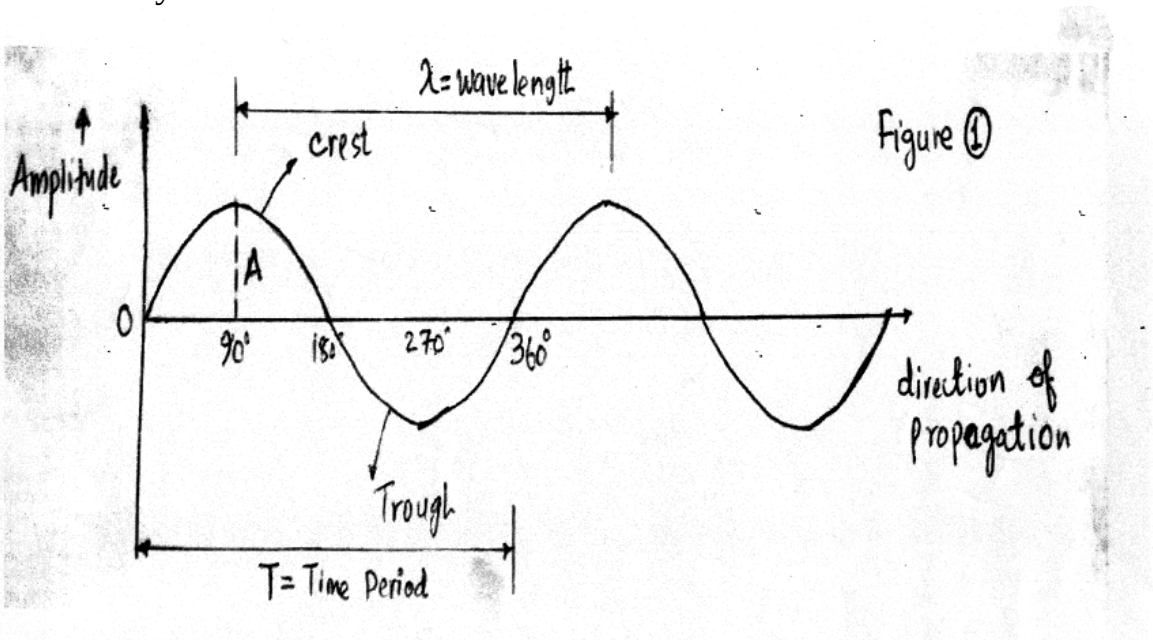


Figure ①

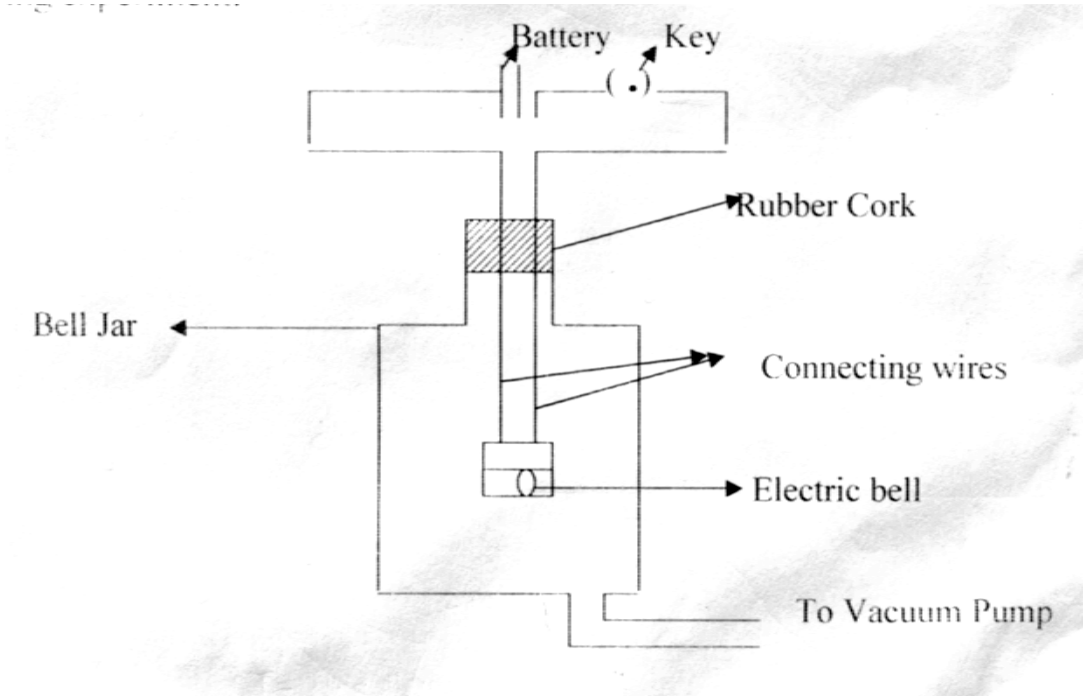
TRANSVERSE WAVE: A wave in which particles of the medium vibrate about their mean position in a direction perpendicular to the direction of the propagation of wave is called transverse wave. These waves propagate in solids and liquids. The waves set up in water by dropping a stone and light wave are examples of Transverse waves. A transverse wave passes through a medium forming crests and troughs. A**crest**is a portion of the medium, which is raised temporarily above the normal position of rest of the particles of medium. A **trough**is a portion of the medium, which is depressed temporarily below the normal position of rest of the particles of the medium.

Vibration: It is a kind of rapid to and fro motion of an object about its central position.

e.g.

1. A stretched rubber band when plucked vibrates and produces sound.
2. Sound is produced when vocal cords of humans vibrate.

SOUND NEEDS A MEDUM TO TRAVEL: Sound wave needs a medium like, air, water etc. for its propagation. It cannot travel through vacuum, which can be demonstrated by the following experiment



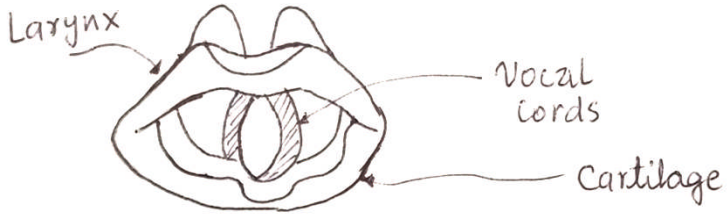
<u>Activity to demonstrate that sound needs a material medium for its propagation:</u>

Sound requires a material medium for propagation. If there is no material medium between two points as in vacuum, sound cannot travel from one point to another. This can be demonstrated with the help of following experiment.

Take a bell jar and fix a rubber cork above it. Pass stout copper wires.Connect the bell to theelectric circuit as shown in figure above. When the key is closed, the bell starts ringing and wehear its sound. Place the jar on the receiver of the exhaust pump. As the pump goes on removing air from the jar, a partial vacuum is being created in the jar. At this stage, we do

not hear any sound though the hammer can be seen striking against the gong. Thus, a material medium is always necessary for the propagation of sound.

SoundProduced byHumans:-Thesound in humans is produced by the voice box that is also known as larynx. The voice box is situated at the upper end of the wind pipe. There are two vocal chordswhich are stretched across the voice box in such a way that it leaves a narrow slitbetween them for the passage of air. When the lungs force air through the slit, the vocal cords vibrate producing sound. Muscles attached to the vocal cords can make the cords tight or loose. When the vocal cards are tight and thin type or reality of voice is different from that when they are loose and thick.



CHARACTERISTICS OF A SOUND WAVE: A sound wave can be described completely by five characteristics: Wavelength, Amplitude, Time-period, Frequency and Velocity. Consider a longitudinal sound wave by the vibrations of a tuning fork.

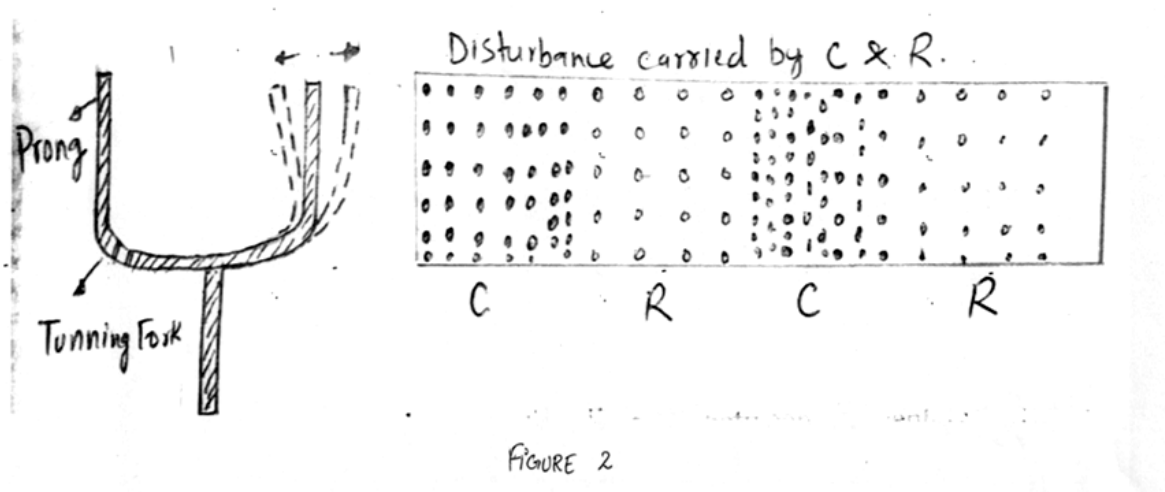


FIGURE 2

WAVELENGTH: In a sound wave, the distance between the centers of two consecutive compressions or two consecutive rarefactions is called its wavelength. The S.I unit of measuring wavelength is meter. Wavelength is denoted by a Greek letter λ**(lambda).**

AMPLITUDE: The maximum displacement of the particles of the medium from their original undisturbed position when a wave passes through the medium is called amplitude of the wave. Amplitude is used to describe the size of wave. It is represented by A. SI unit of amplitude is metre.

Time PERIOD: The time required to produce one complete wave is called time-period of the wave. It can also be defined as time taken to complete one vibration. Time-period is measured in seconds.

FREQUENCY: The number of complete waves produced in one second is called frequency of the wave. If ten complete waves are produced in one second, then the frequency of the waves will be 10 hertz. The S.I unit of frequency is hertz written as Hz. 1 hertz is equal to 1 vibration per second. 1 kHz islOOOHz. The frequency of a wave is denoted by *f*. Some times frequency is denoted Greek letter - (nu).υThefrequency of a wave is the reciprocal of its time- period.

$$\text{Frequency} \quad \frac{1}{\text{Time-period}} \quad \text{or} \quad f = 1/t$$

VELOCITY: The distance travelled by a wave in one second is called velocity of the wave. The S.I unit of velocity of wave is meter per second.

RELATION BETWEEN VELOCITY, FREQUENCY AND WAVELENGTH OF A WAVE:

Suppose a wave travels a distance lambda ( ) which is its wave length in time t then velocity of wave is distance divided by time i.e. distance/time

Or ,v = ƛ/t

V = ƛ 1/t

V= ƛ *f* (1/t=*f*)

In other words, velocity of a wave = wavelengthxfrequency

This is knownas **wave equation.**

CHARACTERISTICSOF SOUND: A sound has three characteristics: loudness, pitch and quality (or timbre)

LOUDNESS: The loudness of sound is a measure of the sound energy reaching the ear per second. Theloudness of sound depends on the amplitude of sound waves. If the sound waves have small amplitude, then the sound will be faint or soft. On the other hand, if the amplitude is large then sound will be loud. When a table is hit hard, greater energy is supplied, table vibrates with a large amplitude and hence produces a loud sound. Loudness is measured in **(decibel)** written as dB. The softest sound is zero dB.

PITCH: Pitch is that characteristic of sound by which we can distinguish between different sounds of same loudness. The pitch of a sound depends on the frequency of vibration. Sounds of low frequency have low pitch and sounds of high frequency have high pitch. A man's voice and a woman's voice differ in pitch. A
man's voice is flat having low pitch, whereas a woman's voice is shrill having a high pitch.

QUALITY OR TIMBRE: It is that characteristic of musical sound which enables us to distinguishbetween the sounds of same pitch and loudness produced by different musical instruments. This characteristic depends on the shape of sound wave. The sounds produced by different musical instruments likeviolin, piano, sitar etc. can be distinguished by their quality.

SPEED **OF** SOUND: The speed of sound is different for different mediums. The speed of sound depends on properties of medium through which it travels. It also depends on the temperature and pressuremedium. The speed of sound decreases as we go from solid to gaseous state. Speed increases if we**increasethe temperature** of the medium e.g., the speed of sound in air are 331m/s at 0^0C and 344m/s at 22°C. In general, sound travels slowest in

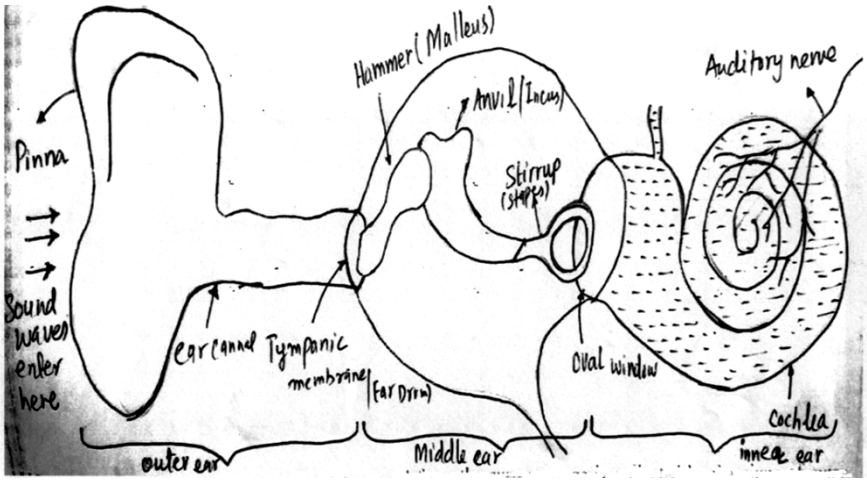
gases, faster in liquids and fastest in solids. The speed of sound in water is 1498m/s and speed of sound in solids (Iron, Steel) is 5000m/s.

RANGE OF **HEARING IN HUMANS:** The sounds in our environment have different frequencies.The sounds of all frequencies cannot be heard by the human beings. The range of frequency from 20hertz to 2000Hz is known as the frequency range of hearing in humans. The sound which we are able to hear is called **audible range.** The audible range of sound frequencies for human ear is from-20hertz to 20000hertz. Thus human ear can't hear sounds which have frequency less than 20hertz or greater than 2000hertz.

INFRASONIC **SOUNDS:** The sounds of frequencies lower than 20hertz are known **as infrasonic sounds.** These are low frequency sounds. Infrasonic sounds are produced bythose objects which vibrateslowly, for example, a vibrating simple pendulum produces ultrasonic sounds which we cannot hear.Itis observed that some birds and animals start running here and there just before the earthquake occurs. This is because, before main shock waves, the earthquake produces low-frequency infrasonic sounds which some animals can hear and get disturbed.

ULTRASONIC **SOUNDS:** The sounds of frequencies higher than 20000hertz are known as ultrasonic sounds. These are high frequency sounds. Ultrasonic sounds cannot be heard by human beings. Dogs can hear sounds of frequency up to 5OOOOhertz. Monkeys, deer, cats, dolphins can hear ultrasonic sounds. Bats can hear sounds having frequencies up to 120000hertz. Bats can also produce ultrasonic sounds whilescreaming. We cannot hear screaming of a bat because; its screams have frequency much higher than 20000hertz which is beyond our limit of hearing. Children under the age of 5 years can hear ultrasonic sounds of frequency up to 25000hertz.

THE **HUMAN EAR:** The ears are the sense organs which help us in hearing sound. The ear consists of three compartments: outer ear, middle ear and inner ear. The part of ear which we see outside the head is called outer ear. The outer ear consists of a broad part called **pinna** and about 2cm to 3 cm lone passage called ear canal. At the end of ear canal is a thin, elastic and circular membrane called **ear-drum** or **tympanum.** Middle ear contains three small bones called **hammer, anvil** and **stirrup.** The inner ear has a coiled tube called **cochlea.** One end of cochlea is connected to the middle ear and the other to auditory nerve which goes into the brain.



WORKING OF HUMAN EAR: The sound from the surroundings is collected by the pinna of outer ear. Thesesound waves pass through ear canal and fall on the ear drum. When the compression of sound wave strikes the ear drum, the pressure on the outside of ear drum increases and pushes it inwards. When rarefactions fall on ear drum, the pressure on outside of ear- drum decreases and it moves outwards. Thusear drum starts vibrating back and forth. The vibrating ear drum causes small bone hammer to vibrate. Vibrations are passed to second bone anvil and finally to the third bone stirrup. The function of three bones isto amplify (make stronger) the vibrations of ear drum. The vibrations are passed to a liquid in the cochlea. The vibrating liquid of cochlea sets up electrical signals in the nerve cells and sends these signals to the brain. The brain interprets these signals as sound and we set the sensation of hearing.

NoisePollution:-Any undesirable sound is termedas noise. Noise pollution is accessible, displeasing human, animal or machine created environmental noise that disrupts the activity or balance of human or animal life. The source of mostoutdoor noise worldwide is mainly ----construction and transport systems including motor vehicle noise, air craft noise and train noise. Poor urban planning may give rise to noise pollution. Indoor and outdoor noise pollution sourcesincludevehicles mega phone's etc.

Effects:- The unwanted sound can damage physiological health. It can cause aggression, hypertension, hearing loss, sleep disturbances and other harmful effects. High noise levels can contribute to cardiovascular effects and increase incidence of coronary artery disease.

- ✓ Draw diagrams on Fair Note Books.
- ✓ Do questions of textbook on Fair Note Books.

Textual questions

Do Q1 to Q7 yourself

8.

Noise	Music
It is an unpleasant sound.	It is a pleasant sound.
It causes discomfort.	It has soothing effect.
It interferes with the Physiological and psychological functions of the body.	It does not do so.

NoisePollution:-Any undesirable sound is termed as noise. Noise pollution is displeasing human, animal or machine created environmental noise that disrupts the activity orbalance of human or animal life. The source of most of noise pollution worldwide is mainly construction and transportation including motor vehicle noise, air craft noise and train. Poor urban planning maygive rise to noise pollution. Noise pollution alsoinclude mega phones etc.

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Class: 8th **Subject: Biology**

Topic: The Cell

Textual Questions:

Q1) Define a cell.

A) Cell is the structural and functional unit of life.

Q2) Whodiscovered the cell?

a) Cell was discovered by an English scientist "Robert Hooke" in 1665 while observing thin slices of cork under his self made crude microscope.

Q3) Give three examples of unicellular organisms?

a) The three examples of unicellular organisms are:- Amoeba, Paramecium, Chlamydomonas.

Answer the following questions:-

i) *Why cells could not be observed before 17th century?*

a) Cells are too small to be visible to the naked eye. There was no concept of microscope before 17thcentury, so the cells could not beobserved.

ii) *Why cork could not be observed as such by Hooke?*

a) Cork could not be observed as such by Hooke as it is a solid structure.

iii) *Where did Hooke demonstrate his observations on cork slice?*

a) Hooke demonstratedhisobservations on cork slice at the Royal Society of London.

iv) *Name the layer which is present outside the plasma membrane in plant cell.*

a) Cell wall is the layer which is present outside the plasma membrane in plant cell.

v) *Name the outermost layer of the animal cell.*

a) Cell membrane or plasma membrane is the outermost layer of an animal cell.

vi) *Name the cell part that has holes.*

a) Nuclear membrane is the cell part that has holes.

vii) *Where are chromosomes present in a cell?*

a) Chromosomes are present in the nucleoplasm of nucleus.

viii) *Name the cell organelles which are found in plant cell.*

a) The cell organelles which are found in plant cell are:

Cell Wall	Chloroplasts	Golgi complex
Plasma membrane	Vacuoles	Lysosomes
Nucleus	Endoplasmic	Ribosomes.
Mitochondria	reticulum	

ix) *Name thecells having branched structure.*

Ans. Nerve cells are the cells which have branched structure.

x) *Which cell can be observed with unaided-eye?*

Ans) Ostrich egg is the cell which can be observedwith the unaided eye.

*Q5)Mentionthefunctionsofthefollowing**:-***

a) *Cell membrane***:-**It is also called as plasma membrane and is the outermost layer in animal cells. It is a living structure and is semi permeable in nature.

Functions:

1) It encloses a living substance called as cytoplasm.
2) It controls the movement of substances in andout of the cell through tiny holes.
3) It provides protection to internal cell organelles.
4) It provides shape and rigidity to the cells.

b) *Chromosomes*are thick thread like structures which contain genes.

Functions

1) Chromosomes contain genes that help in the inheritance (transfer) of characters from parents to offspring.

Q6) Why are following important to a plant cell**?**

Cell wall:- It is the outermost covering found in plant cells only. It is made up of stiff, non-livingmaterial called cellulose. It is absent in animal cells.

Functions:-

a) It surrounds the cell membrane of the cell.
b) It gives shape to the cell.
c) It provides protection to the cell.
d) It gives rigidity to the cell.

Chloroplast:- It is present only in plant cells.Chloroplasts are green coloured plastids containing green coloured pigment "chlorophyll".

Functions:-

a) It helps green plants to prepare food by the process of photosynthesis.

*Mitochondria***:-**It is tiny rod shaped or thread like organelle having an outer and inner membrane.

Functions:

1) It performs the function of respiration.
2) It provides energy to the cell.

Nucleus:- The nucleus is the most important part of an eukaryotic cell. It has following components:

Nuclear envelope and nuclear membrane.
Nuclear sap or nucleoplasm
Nucleus and
Chromatin.

Functions:

1) It plays an important role in cell division.

2) Itcontrols and co-ordinates all activities of the cell.

3) It contains the genes that determine heredity.

Q7) Draw an outline diagram of an animal cell. Label the different parts.

Q8) Mention three differences between plant cell and animal cell.

Ans. The three differences between plant cell and animal cell are:

Plant cell	*Animal cell*
Cell wall is present.	Cell wall is absent.
Plastids are present.	Plastids are absent.
Only one large vacuole is present.	Vacuoles are more in number but small size
Lysosomes are either absent or very few in number.	Lysosomes are present and large in number

Q9) What features are possessed by both plant cells and animal cells?

The features that are shared or possessed by both plant cells and animal cells are:

Plasma membrane, mitochondria, endoplasmic reticulum, golgi complex, lysosomes and ribosomes.

Q10) Why are nerve cells long? Why do these cells have projections?

Nerve cells are long because it has to take impulses away from cell body. Nerve cells have projections in order to receive impulse.

Q11) Why are mitochondria known as power house of the cell?

Mitochondria are known as power house of the cell because it produces energy necessary for cellular functions.

Q12) Which four basic elements constitute more than 90% of protoplasm?

The four basic elements which constitute more than 90% of protoplasm are:

1) Carbon (C) 2) Hydrogen (H)

3) Oxygen (O) 4) Nitrogen (N)

Q13) Write in brief about the variation in shape and size of cells.

Variation in cell shape:- The basic shape of eukaryotic cell is spherical but the shape of cell is determined by the function of the cell. Thus, the shape of cell may be variable or fixed. Variable or irregular shape occurs in amoeba and white blood cells. Fixed shape of cell occurs in most plants and animals. Thus, cells may have diverse shapes such as polyhedral with (8 ,12 or 14 sides), spherical (eggs of many animals), spindle shaped (smooth muscle fibres),elongated (nerve cells), branched (pigment cells of skin), discoidal (red blood cells) and so on.

Variation in cell size:- The size .of different cells ranges between broad limits. Some plant and animal ceils are visible to the naked eye. Most cells, however, are visible only with a microscope, since they are only a few micrometers in diameter. The size of cells varies from very small cells of bacteria (0.2 5.0 µm)to the very large eggs of the Ostrich (1 70 x 135mm). Some nerve cells of human beings have a metre long tail. A single marine alga, acetabularia, measures nearly 10cm in height. The fibre cells of Manila hemp are over 100cm in length. Living red blood cells measures about 9 µm. Most other cells are between 20- 30µ in diameter. Smallest known cell is of bacterium. Mycoplasma that measures about 0.1µm.

Q14) Name the different cell organelles and the functions of these organelles.

The different cell organelles and their functions are given below:-

Organelle	Function
Mitochondria	It is the centre of cellular respiration and centre of production of energy in the form of ATP (Adenosine tri phosphate) molecules. Hence, it is called as power house of cell.
Vacuoles	It stores food as food vacuole and water as water droplets.

Plastids	It helps in the manufacture of food by photosynthesis. It acts as a centre for storage of food materials in cytoplasm. It gives colour to fruits and flowers.
Endoplasmic reticulum	It is a site of protein synthesis. It provides mechanical support to the cytoplasm. It helps to transport substances in the cytoplasm.
Golgi bodies	It helps in the secretion and synthesis of many substances. It is involved in transportation of certain materials out of the cell.
Lysosomes	It helps in the intracellular digestion, destroys old organelles and defend cells against pathogens. So, it is called as cellular housekeeper.
Ribosomes	It helps in the synthesis of proteins. Hence, are called as protein factories of the cell.
Chromosomes	It helps in the transfer of characters from parents to off-springs.

Q15)What is meant by protoplasm? How does it differ from cytoplasm?

Protoplasm has been derived from Latin word proto meaning first and plasma meaning liquid. Protoplasm is liquid material of cell. Cytoplasm along with nucleus and plasma membrane is known as protoplasm. It is made up of carbon, hydrogen, nitrogen and oxygen. Other elements such as sulphur, phosphorous and calcium are also present. These elements in special combination provide living nature to protoplasm.

:

However, cytoplasm is jelly like substance occupying most of space inside the cell. It occupies the space between the cell membrane and nucleus. It contains very important tiny structures called as organelles which perform various life functions.

Additional Questions

1) Write a note on discovery of cell.

Cell was discovered by an English scientist, Robert Hooke in 1665. He observed thin slices of cork under his crude microscope. He found that the cork was made of box like compartments, forming honey comb like structures. He named these compartments as cells.

2) What are the basic facts, of cell structure and function?

The basic facts of cell structure and function are:

i) Cells are the basic structural and functional units of life.

ii) These are the building blocks of living organisms.

iii) All cells contain cell organelles.

iv) Functioning of cells is responsible for the functioning of organisms.

3) List the differences between prokaryotic cell and eukaryotic cell.

The differences between prokaryotic cells and eukaryotic cells are:-

Prokaryotic cells	*Eukaryotic cells*
Size of cell is generally small (1-10 µn).	Size of cell is generally large (5 - 100 µm).
They are primitive and incomplete cells.	They are advanced and complete cells.
Nuclear material is not bound by nuclear membrane.	Nuclear material is bound by nuclear membrane.
Membrane bound organelles are absent.	Membrane bound organelles are present.
It contains single chromosome.	It contains more than one chromosome.
Examples are bacteria and cyanobacteria.	Examples are plants and animals.

4. Distinguish between plasma membrane and cell wall.

Plasma membrane	Cell Wall
It is living.	It is non living.
It is made up of phospholipids, proteins and polysaccharides.	It is made up of fibrous polysaccharide called as cellulose.
It is semi permeable.	It is permeable.
It is delicate.	It is rigid.
It is found in both plant and animal cells.	It is found in plant cell only

5. Define cell as a basic unit of life.

A cell is called basic unit of life because it performs all life functions like intake of food materials, excretion, metabolism, respiration, etc. For this a cell usually possesses a number of components or cytoplasmic structures called cell organelles. Each cell organelle performs a different function like clearing waste material, making new materials, protein synthesis, lipid synthesis, RNA synthesis, etc. This results in division of labour inside a cell. A cell is able to live and undertake various life functions because of its cell organelles. Since life functions are the same in all types of cells, the various cells possess same cell organelles despite belonging to different organisms and performing different functions.

6. Draw an outline diagram of a plant cell. Label its different parts.

Draw it yourself

Coal And Petroleum Additional Questions

Q1*Define the following:*

i) Carbonisation:-The slow conversion of wood into coal by biochemical processes extendingover millions of years is called carbonization.

ii) Fossils: - The dead remains of plants and animals preserved in the earth, are called as fossils,

iii) **Fossil fuels:** - The fuels that are preserved in the earth as the remains of plants and animalsare called fossil fuels.

iv) **Destructive distillation:-**The process due to which complex carbon compounds on heatingin a closed vessel, in absence of air, decomposes into simpler compounds is calleddestructive distillation.

v)Petroleum refining:- The process of separating various constituents or fractions of petroleum is known as petroleum refining.

vi) **Fractional distillation:-** It is a method of separation of mixture of liquids of different boilingpoints by condensing their vapours at controlled temperature, is called fractional distillation,

vii) **Petrochemicals:-**The organic compounds prepared from the various fractions obtained frompetroleum and natural gas are called as petrochemicals. For example methyl alcohol, ethylalcohol, benzene, acetone, acetic acid etc.

Petrochemicals are very important because they are used to manufacture a wide range ofuseful products. For example detergents, synthetic fibre, plastic, synthetic rubber, drugs,dyes, fertilizers, perfumes, insecticides, explosives etc.

viii) **Calorific value;-**It is the amount of heat energy produced by burning 1kg of fuel completelyin air.

ix) **Global warming:-**The average increase in the temperature of the earth due to green housegases is called global warming.

Q2 *Discuss in detail about the fractional distillation of crude petroleum.*

Ans. Crude petroleum is heated to a temperature of 400°C or slightly above it in a furnace. The vapours of petroleum are fed into a tall fractionating column near its bottom. As the vapours rise up in the column, they lose heat and hence their temperature drops. Thus, fractionating column maintains itself at different temperatures which decrease in magnitude in upward direction. Due to this difference in temperature, the vapours with higher boiling point condense first but the vapours with lower boiling point rise up and condense in different parts of fractionating column. The vapours which do not liquefy are taken out from the top of fractionating column.

Fractions Of Petroleum

a) Residual oil:-It is subjected to fractional distillation above 400°C when the followingproducts are obtained.

i) Bitumen:-It is black and sticky semi solid. It is non- volatile in nature.

Uses

- It is used for surfacing of roads.
- It is used in paints.

ii) Paraffin wax:-It is white semi solid having boiling point above 400° C.

Uses

- It is used for making Vaseline and ointments.
- It is used for making candles.
- It is used for making wax papers, matchsticks etc.
- It is used as grease.
- It is used for making cosmetics.

iii) Lubricating oil:- It is thick viscous oil.

Uses

- It is used for lubricating machines.

b) **Fuel oil:-**It is mixture of hydrocarbons. Boiling point varies from 350°C to 400°C.

Uses:

- It is used as an industrial fuel.
- It is used for raising steam in boilers.

c) **Diesel oil:-**It is a mixture of hydrocarbons. Boiling point varies from 250 C to 350 C.

Uses:

- It is used to run heavy vehicles such as buses, trucks etc.
- It is used to run engines for lifting water for fields.
- It is used to run generators for providing electricity.

d) **Kerosene oil:-**It is a mixture of hydrocarbons. Boiling point varies from 170°C t o 250°C.

Uses

- It is used as a household fuel.
- It is used as an illuminant.
- In purified form, it is used as aviation fuel.

e)**Gasoline or petrol:-**It is a mixture of hydrocarbons. Boiling point varies from 40°C -170°C.

Uses:

- It is used as fuel for light vehicles.
- It is used as dry cleaning fluid.
- It is used for preparing petrol gas which is used in laboratories.

f) **Petroleum gas:-**It is a gaseous mixture of hydrocarbons. The boiling point is below 40°C.

Uses

- Petroleum gas is liquefied under pressure and marketed in steel cylinders as liquefied petroleum gas (L.P.G). It is thus used as a household fuel.
- It is used in the manufacture of petrol.

Q3)*Write a note on the mineral resources (fuels) in Jammu and Kashmir.*

Ans. The important minerals resources (fuels) in Jammu and Kashmir are:

i) Coal ii) Petroleum and natural gas iii) Lignite

Coal is found in Jammu province while as lignite is found in Kashmir province.

Coal:-This most important resource is found in Jammu division. The coal belt extends fromJungalgali to Jigni over a distance of 36 miles. The important coal fields on western side are foundin Kalkote, Metka and Mahagali. In addition, the coal belt of good quantity and quality is located oneast of Kotlion the fringes of Great limestone formation where hundred millions tones of coal arereported to exist. Production of coal ranges from 9,000 to 10,000 million tones per annum.

Petroleum and Natural gas: - Some resources of natural gas and petroleum are found nearNowshera, Dharmasthal and some areas of Ram Nagar Tehsil. Very little quantity of petroleum isdiscovered near Surinsar area.

Lignite:-The deposits have been found in Handwara, Raithan, Oiodrr in Kashmir Valley.

Q4)*Give the geological distribution of coal producing areas of J&K.*

Ans. Geologists have distributed coal producing areas of J&K into two groups: **Group A: - (With western sector)**

i) Kolakote area (Sair Block) ii) Tata Pani Block,

iii) Jigni Block iv) Mahagala

Group B: - (Central Sector) Chakkar- Chakha - Jangalgali

i| Chakkar area chokri, Sujjanpur, Kalimiti.

ii) Sangarmarg- Chinkhar (Panshasa, Paddar and Thakrakot).

iii) Jangalgali (lain, Gouri, Mitti, Thalival, AnjiKhad to Salal).

iv) Metka

Q5)***What are the important industrial minerals of Jammu and Kashmir?***

Ans.The important industrial minerals available and their occurrence is as follows:

Name	Region where found
a) Borax	Pagga Valley (Ladakh)
b) Cement Stone	Wuyan (Kashmir), Reasi and Basohli (Jammu)
c) China Clay	Chakhar, Tikri, Salal, Jangalgali (Jammu)
d) Gypsym	Ramban, Batote, Good GulabGarh (Jammu), Lachhipura, KathuaNullah, Baramullah, Anantnag (Kashmir).
e) Graphite	Braripora, Uri, Karnah, Malogam, Piran (Kashmir), Kishtwar (Jammu)
f) Ochire	Nurkhawan, Ratasar, Jhaggi(Kashmir)
g) Mica	Doda, Ramban, Reasi (Jammu)
h) Sulphur	Pagga Valley (Ladakh), Anantnag, Khrew (Kashmir), Rajouri (Jammu).
i) Slate	Ramsu, Banihal ,Ramban (Jammu) , Baramullah (Kashmir).
j) Asbestos	Kargil
k) Marble	Drugmulla, Zirhaina, Oura, Trehgam (Kashmir) ,Thatri(Jammu).

Q6)*Write a detailed note on petroleum.*

Ans. The name petroleum is derived from a Greek word "petra" meaning "rock" and "oleum" meaning oil signifying that it occurs under the earth's crust trapped in rocks. It is a dark coloured viscous, strong smelling liquid which is a natural product and is obtained from oil wells. The crude oil or petroleum is acomplex mixture of several solid, liquid and gaseous hydrocarbons .mixed with water, salt and other particles. Petroleum is lighter than water and is insoluble in it.

Formation of petroleum:- Refer to textual question (Q8)

Mining or extraction of petroleum:-Petroleum is obtained by drilling holes called oil wells into the earth's crust where the presence of oil has been predicted by survey. The oil wells are drilled by using drilling rigs (a drilling rig is a large structure with equipment for drilling an oil well). When a well is drilled through the rocks, natural gas comes out first with great pressure and after some time the oil comes out by itself due to gas pressure. After the pressure has subsided, the crude oil is pumped out of the oil well.

The first oil well was drilled in Pennsylvania (U.S.A) in 1859. In India oil was first drilled out at Makum in Assam.

Oil Production in India:-Some of the places where petroleum is being produced from oil wells are:-

- Ankleshwar and Kalol in Gujarat. RudraSagar and LakwaIn Assam. Offshore Areas Of Bombay High.
- Delta's Of Cavary, Krishna and Godavari.

Exploration for more oil is going on under the super vision of oil and natural gas corporation(ONGC) throughout the country.

Refining Of Petroleum:-Refer to Additional questions (Q2)

Q7)*WhatisL.P.G? Give its advantages.*

Ans.. L.P.G (Liquefied Petroleum Gas) It is petroleum gas which is liquefied under pressure. In L.P.G, butane is present in very large quantity and some compounds of ethyl mercaptanis added to it in order to detect its leakage.

Advantages of L.P.G

1. It can burn easily.
2. It has a high calorific value.
3. It burns with less smoky flame and does not pollute the air.
4. It does not produce poisonous gases.
5. It does not leave any ash or solid residue on burning.

Q8)*Write a detailed note on natural gas.*

Ans. Natural gas:- It is also a fossil fuel and is formed under the earth by the decomposition of vegetablematter lying under water. This decomposition is carried out by anaerobic bacteria in absence of air.Natural gas mainly consists of 95% of methane (CH_4) with small quantities of ethane (C_2H_6) and
propane (C_3H_8). It occurs deep under the earth's crust either alone or along with oil above thepetroleum deposits.In India, natural gas has been found in Tripura, Rajasthan, Maharashtra and In Krishna GodavariDelta.

Q9)*How is CNG formed and give its advantages?*

Ans. When natural gas is compressed under high pressure, it forms compressed natural gas which iswritten in short form as CNG. CNG is easier to store, transport and use.

Advantages of using CNG

1. CNG is a cleaner fuel because it burns easily and produces a lot of heat. Moreover, it burns with a smokeless flame and causes no air pollution. It also does not produce any poisonous gases onburning and does not leave behind any solid residue.
2. CNG is a complete fuel in itself and can be used directly for heating purpose in homes and in industries. There is no need to add anything else to it.
3. A great advantage of natural gas is that it can be supplied to homes and factories through a network of underground pipes. Such a network of pipe lines exists in vadodra in Gujarat, in some parts of Delhi and a few other places.

Q10)List some of the uses of natural gas.

1) It is used as a domestic and industrial fuel.
2) It is used as a fuel in thermal power stations for generating electricity.
3) CNG is used as a fuel in transport vehicles in place of petrol and diesel.

4) It is used as a source of hydrogen gas needed to manufacture fertilizers.

5) It is used as a starting material for the manufacture of no. of chemicals which are called as petrochemicals.

Q11)*Why should we use fossil fuel only when absolutely necessary?*

Ans. We should use fossil fuels only when absolutely necessary because:

1. It will ensure the availability of fossil fuels for a larger period of time.
2. It will reduce air pollution and lead to a cleaner environment.
3. It will reduce the risk of global warming.

Q12)*What are the various tips given by petroleum Conservation Research Association (PCRA) forminimizing the wastage of petrol and diesel while driving vehicle?*

Ans. The various tips are:-

1. Drive a vehicle at a constant and moderate speed as far as possible.
2. Switch off the vehicle's engine at traffic lights or at a place where a person has to wait.
3. Ensure correct air pressure in the tyres of the vehicles.
4. Ensure regular maintenance of the vehicles.

Project work;

- Make a model of candle flame depicting its various zones.
- Collect at least ten samples of various minerals.

Textual Questions

Ql What are the advantages of using CNG and LPG as fuels?

Ans. The advantages of using CNG and LPG as fuels are:

i) It is a non-polluting fuel for vehicles as it does not produce much smoke.

ii) It is used for power generation.

iii) It can be used directly for burning in homes and factories.

Q2)Name the petroleum product used for surfacing of roads.

Ans. "Bitumen" is a petroleum product which is used for surfacing of roads.

Q3) Describe how coal is formed from dead vegetation. What is this process called?

Ans. Coal was formed in prehistoric times some 200 million year ago. It was formed when huge dense forest area got buried under the surface of earth due to natural calamities such as floods, earthquakes, volcanic eruptions etc. Under humid and hot conditions, they were attacked by anaerobic bacteriawhich removed hydrogen and oxygen leaving behind carbon.Due to very high temperature andpressure of the earth, the carbon got compact to form stony residue called as coal. This process iscalled as carbonisation which is defined as the slow conversion of wood into coal by biochemicalprocesses extending over millions of years.

Q6) Explain why fossil fuels are exhaustible natural resources?

Ans.Fossil fuels are exhaustible natural resources because it takes millions of years for its foundation andcannot be renewed over a short period of time. Furthermore, they are limited in nature and are notused with absolute care by humans.

Q7) *Describe characteristics and uses of coke.*

Ans. Coke is formed by the destructive distillation of coal. It is tough, porous and black substance. It isthe purest form of carbon as it contains 95-98% carbon. It is a clean fuel than coal as it does not emitmuch smoke on burning.

Uses:-

- It is used in the manufacture of steel.
- It is used in metallurgy for extracting metals.

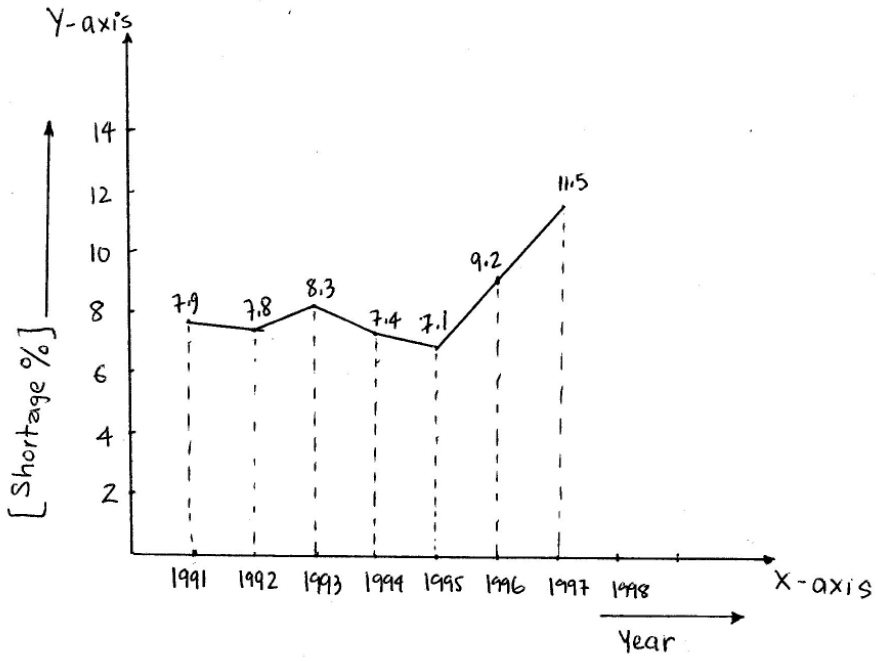
Q8)*Explain the process of formation of petroleum***.**

Ans. It has been derived from Latin word 'petra' meaning rock and 'oleum' meaning oil. So petroleum literally means rock oil because it is found trapped between two impervious rocks. Millions of years

ago, very large number of microscopic plants and animals lived in sea. They died because of some calamity and their bodies sank to the bottom of the sea. These dead bodies then got covered by mud and sand. Thus, the bodies of dead plants and animals decayed in absence of air under very high temperature and pressure of earth, which resulted in the formation of petroleum and natural gas. Petroleum gas got trapped between two layers of impervious rocks and natural gas got collected above it under high pressure.

Q9)*The following table shows the total power shortage in India from 1991- 1997. Show the data in the form of a graph, plot shortage percentage for the years on the Y-axis and the year on X-axis.*

S.NO	Year	Shortage (%)
1	1991	7.9
2	1992	7.8
3	1993	8.3
4	1994	7.4
5	1995	7.1
6	1996	9.2
7	1997	11.5



Q10)What are exhaustible natural resources? Give examples.

Ans. The resources that are present in limited quantity in nature, and can get exhausted by humanactivities. For example, coal, petroleum, minerals, forests etc.

Q11)What are inexhaustible natural resources? Give examples.

Ans. The resources that are present in unlimited quantity in nature and cannot get exhausted by humanactivities. For example air, sunlight etc.

Q12)Why is natural gas called as a clean fuel?

Ans. Natural gas is called as clean fuel because it is less polluting. It does not produce smoke on burning.

Q13)What are the uses of coal?

Ans. Coal is black, hard stone. When it is subjected to destructive distillation, it produces a number ofvaluable products such as coke, coal gas, coal tar which are then put to various uses.

Uses of coal are:

i) It is used as a household fuel.
ii) It is used to produce steam in railway engines.
iii) It is used to produce electricity in thermal power plants.
iv) It is used as an industrial fuel.

Topic: CONSERVATION OF PLANTS AND ANIMALS

Conservation:- It is defined as the management of the human use of the biosphere so that it may yield the greatest benefits to the present generation while maintaining its potential to meet the needs for the future generation. It is the wise and judicious use of resources.

Aims of Conservation:-

i) To preserve the quality of environment i.e. maintain a pollution free environment.

ii) Ensuring the continuous yield of useful materials, living or non-living, by establishing a balanced cycle of harvest and renewal.

Biosphere:- It is that part of the earth in which living organisms exist or which supports life.

Wildlife:- It means all the animals and plants which are found naturally in the forests and other natural habitats.

Biodiversity:- It refers to the variety of organisms found in a particular area, it denotes the richness of species in a particular habitat.

Ecosystem:- It includes all the living organisms of an area and the physical environment in which they live. In an ecosystem various living organisms interact among themselves through food chains and also with the physical environment in which they live.

WildAnimals:- The animals living in the natural environment like forest are called wild animals. These are not domesticated by man.

Wildplants:- The plants growing in natural environment on their own are called wild plants. These are not cultivated by man.

Greenhouseeffect:-The trapping of heat rays by carbon dioxide resulting in warming up of the earth's atmosphere is called Green house effect.

Globalwarming: The gradual increase in the overall temperature of earth's atmosphere due to green house effect caused by the increased level of CO_2in the atmosphere is called global warming. . :

Desertification:-Gradual conversion of a fertile land into a desert is called desertification.

Flora:- The plants that grow naturally in a particular area are called flora of the area e.g. teak, fern mango are the flora of Pachmarhi Biosphere Reserve.

Fauna: The animals which live naturally in a particular area are called fauna of that area e.g. wolf, leopard, wild dog are the fauna of Pachmarhi Biosphere Reserve.

Fertile Offspring:- A fertile offspring is a baby animal or a baby plant which can reproduce its own kind of organisms in due course of time.

Species:- A species is a group of same kind of organisms which can interbreed to produce fertile offspring. All the members of a species have common features. Some of the examples of species are Human, cat mango, paddy etc. There are about six lakh species of animals and four lakh species of plants in the world today.

EndemicSpecies:-These are those species of plants and animals which are found exclusively in a particular area. These are restricted to a certain area and are not found naturally anywhere else in other areas. For example sal and wild mango are the endemic flora of the PachmarhiBioshere Reserve. Indian giant squirrel, flying squirrel and bison are the endemic fauna of the Pachmarhi Biosphere Reserve.

Factors endangering the existence of endemic species:-

i) Destruction of forests
ii) Introduction of new species.
iii. Increasing human population.

ExtinctSpecies:-

The species which no longer exist anywhere on the earth are called extinct species. These have died out completely. A species becomes extinct when the last living member of that species dies e.g. Dinosaur, Dodo, cave lion, Caspian tiger and Irish deer are all extinct and have vanished from the earth.

EndangeredSpecies:-The species which are facing the risk of extinction are calledendangered species. These are on the verge of vanishing from the earth. These exist in small number on the earth, and if we do not take quick action to save them, they may become extinct. The small animals are much more in danger of becoming extinct than the bigger animals. Some examples of endangered animal species are Tiger, Snow Leopard, Asiatic lion, Kashmir stag (Hangul), Desert cat etc.

Extinct in wild:- The species of which captive individuals survive but there is no free living natural population comes under this category e.g. Black Soft-Shell Turtle, Hawaiian Crow etc.

Critically endangered:-The species which faces a very high risk of extinction in the wild is known as critically endangered species e.g. Ivory Billed wood-pecker, Mountain Gorilia, the Little Dodo Bird etc.

Vulnerable Species:- These are the species which are likely to move to endangered category in near future if causative factors continue to operate e.g. Asian Black Bear, Indian Rhinoceros, African Elephant etc.

Rare Species:- These exist in small number and are localized in certain geographical area and may enter into vulnerable category e.g. red wolf, Golden Tabby Tiger, Wild Buffalo etc.

Biodiversity Hot Spots:-These are the earth's richest and most diverse areas in terms of their flora and fauna. India contains about 25-Hot spots and some of them are:-

i) Silent valley (Kerala) iii) Gir forest (Gujarat)

ii) Himalayas (India/Nepal)

Chipko Movement:-The movement was born in a small hilly village of the upper reaches of Himalayas. The illiterate tribal women commenced this unique movement in December 1972 that became famous as the Chipko (means to embrace) movement. The movement commenced in the Tehri-Garhwal district of U.P. that actually gathered momentum in 1978 when the women faced police firing. It looked as if the movement aimed at saving trees on the Himalayan slopes from the axes of greedy contractors, but its objectives were broad-based. However, chipko reached to Karnataka as "Appiko".

Deforestation:-Itis the process of clearing of forests by cutting down forest trees over a wide area. Trees in the forest are cut for some of the below mentioned purposes:-

i) Procuring land for cultivation.
ii) Building houses and factories.
iii) Making furniture.
iv) Using wood as fuel. ,
v) Developing industries.

Causes of Deforestation

The main causes of deforestation can be grouped into following two types:

1) Man-made causes 2) Natural causes

Man-madecauses of deforestation include all such ways by which man cuts the trees on alarge scale so as to fulfil1 his various needs.

Natural causes involve the destruction of forests by natural processes like forest fires and severe droughts.

Effects/Consequences of deforestation:

Deforestation is the biggest threat to the existence and survival of living organisms in the following ways:-

1) It snatches away the natural habitat of many animals, plants and birds. It puts many species in endangered zone and many get extinct.
2) Increased temperature on earth would disturb the water cycle and may reduce rain fall causing droughts.
3) As Pollution level increases level of carbon-dioxide in the atmosphere would go up. This would lead to global warming.
4) In the absence of forest cover, the summer becomes hotter while winters become severely cool.
5) Removal of plant cover in the plains makes the area dry. The soil becomes loose leading to desertification. .
6) Removal of plant cover exposes the fertile soil to wind and water leading to soil erosion. .Groundwater level would go down.
7) A number of useful products obtained from trees are also lost. The other properties of the soil like texture, nutrient content etc. also change.

Conservation of Forests and Wildlife (Biodiversity):

Forests and wildlife need to be conserved to preserve biodiversity, to prevent endangered species from becoming extinct and to maintain ecological balance in nature and this can be achieved in the following ways:

1) Deforestation should be avoided.
2) Afforestation should be undertaken.
3) Hunting of animals which is banned should be strictly enforced.
4) Illegal trade in animal skin and elephant tusks should be checked.
5) Alternate sources of energy should be encouraged.
6) Protected areas should be established.
7) Effective system to prevent and fight forest fires should be established.

8) Regular surveys to monitor the population of all the species in forests should be conducted.
9) Laws to conserve biodiversity should be enacted and strictly enforced.
10) Environmental awareness programmes should be conducted on a large scale.
11) NGOs should be provided encouragement to undertake conservation work.

Reasons for Conservation of Wildlife:

1. Ecological diversity
2. Aesthetic value of wildlife.
3. To maintain environmental quality.
4. To preserve genetic pool.
5. To earn money.
6. For breeding programmes.
7. Essential for forest ecosystem.
8. To maintain balance in nature.
9. To maintain greenery of nature.

Protected Areas

There are three types of protected areas which have been established by the Government for the conservation of forests and wild animals. These are:

1) Biosphere Reserves 3) National Parks
2) Wildlife Sanctuaries

1) *Biosphere reserve*:- It is a large protected area of land meant for the conservation of wildlife, biodiversity and the traditional lifestyle of the tribal people living in the area. A Biosphere Reserve is divided into three zones:

i) Core zone ii) Buffer zone iii) Transition zone

*Core zone***:-** The innermost zone of Biosphere Reserve is known as core zone. No human activity is allowed in this zone and it is meant for strict protection of wildlife.

Buffer zone:- The middle zone of a Biosphere Reserve is called buffer zone. It surrounds the core zone. In this zone only limited human activity is allowed e.g. research, environmental education and tourism.

Transition zone:- The outermost zone of a Biosphere Reserve is called transition zone. In this zone several non-destructive human activities are allowed such as houses of tribals, cultivation of crops.

A Biosphere Reserve may also contain other protected areas in it e.g. Wildlife sanctuaries or National Park. No commercial exploitation of natural resources is allowed in a Biosphere Reserve.

Different Biosphere Reserves in India:-

There are fourteen Biosphere Reserves in India and some of them are:-

1)Great Nicobar Biosphere Reserve (Andaman and Nicobar)

2)Kaziranga Biosphere Reserve (Assam)

3)Sunderbans Biosphere Reserve (West Bengal)

4)Kanha Biosphere Reserve (Madhya Pradesh)

5)Pachmarhi Biosphere Reserve (Madhya Pradesh)

Pachmarhi Biosphere Reserve contains other protected areas in it. It contains two Wildlife sanctuaries and one National Park. The two Wildlife Sanctuaries are Bori Sanctuary and Pachmarhi Sanctuary and the National park is Satpura National Park.

Functions Of Biosphere Reserve:

1. It helps in the conservation of wildlife of the area.
2. It helps to maintain the bio-diversity of the area.
3. It preserves the ecosystems in the area.
4. It promotes the economic development of the area which is compatible with conservation objectives.
5. It helps to maintain the lifestyle and culture of the tribal people living in the area. It prevents the commercial exploitation of the area.
6. It provides opportunities for scientific research, environmental education and tourism.

Wildlife Sanctuary :-It is a protected area of land which is created for the protection of wild animals in their natural environment. It provides protection and suitable living conditions to the wild animals in their natural habitat. Killing and capturing of wild animals is strictly prohibited. India has more than 500 wildlife sanctuaries. The names of some of these are:-

1. Sanjay Gandhi Wildlife Sanctuary (Maharashtra).
2. Mudumalai Wildlife Sanctuary (Tamil Nadu)

3. Bharatpur Bird Sancturay (Rajasthan)
4. Dandeli Wildlife Sanctuary (Karnataka)
5. Overa Wildlife Sanctuary (J&K)

Zoo: It is the short form of Zoological garden or 'Zoological Park'. A large garden or park where many types of wild animals and birds brought from different parts of the country and the world are kept in cages or enclosures, so that people can see them, is called a zoo.

National Park:-Itis a relatively large area of scenic beauty protected and maintained by the government to preserve flora and fauna, landscape, historic objects of the area and places of scientific interest. It also provides human recreation and enjoyment. It is large and diverse enough to protect whole sets of ecosystems. The exploitation of natural resources is strictly prohibited.

India has more than 80 National parks. Many of these were initially wildlife Sanctuaries. Some if the prominent National parks of India are:-

- Corbett National Park (Uttarakhand)
- Kanha National Park (Madhya Pradesh)
- Gir National Park (Gujarat)
- Kaziranga National Park (Assam)
- Dachigam National Park (Jammu and Kashmir)

Project Tiger:- It is a wildlife conservation project which was launched by the Government of India on 1st April 1973 to protect the tigers in the country. The objective of this project was to ensure the survival and maintenance of the tiger population in specially constituted Tiger Reserves throughout India. There are 28 Tiger Reserves in India at present which are governed by Project Tiger. One such Tiger Reserve is the Satpur Tiger Reserve of Satpura National park, following are its various objectives:-

1. To maintain a viable population of tigers for scientific, cultural and ecological values.
2. To preserve areas rich in biodiversity as a national heritage for the education and enjoyment.
3. To promote elimination of all forms of human exploitation and disturbance from the core zones.

Differentiate between:

Biosphere Reserve	**Wildlife Sanctuary**
It is spread over a very large area of land.	It occupies a comparatively smaller area of land.
Local people form an integral part of it.	Local people do not form an integral part of it.
Human activities are allowed in its outermost zone.	Human activities are not allowed.

Wildlife Sanctuary	**Zoo**
Here wild animals and birds live in their natural habitat in the forest.	In a zoo, wild animals live in settings such as cages and enclosures.
It is not open to public freely.	It is open to public for a fixed time every day.
Wild animals and birds are very comfortable in this natural environment.	Wild animals and birds are not comfortable in this artificial-environment.

Wildlife Sanctuary	**National park**
It protects and preserves the wild animals in their natural environment.	It protects and preserves wild animals and in their natural environment as well as the scenic beauty, historical objects and habitats of scientific interest in the area.
It is dedicated to the protection of wild animals only.	In addition to protection, wild animals are kept for recreation, enjoyment and educative interests.
It usually does not allow easy access to the visitors.	It allows easy access for the visitors to the land and wildlife inside.

Recycling of Paper

Paper is made from wood pulp that is produced from the wood of forest trees. Paper making is as such a cause of deforestation as many trees have to be cut down from the forests to make paper. We should save paper to save the forest trees. The term recycling of paper means to process waste paper so that it can be used again. Paper can be recycled five to seven times for use. We should 'save paper', 'reuse paper' and 'recycle paper' and it can help us:

1. To save forest trees from being cut down
2. To save water used in paper making.
3. To save energy (electricity) used in making paper.
4. To reduce the amount of harmful chemicals used in paper making.

*Red Data Book***:-**It is a publication which keeps record of all the endangered animal, plants and other species. It contains a list of species which are in danger of becoming extinct. There are different Red Data Books for plants, animals and other species The advantage of maintaining Data Book is that we come to know which species of animals and plants are very small in number and facing the danger of extinction so that timely remedial steps can be taken by the

Authorities concerned to prevent their extinction. It is maintained by IUCN (International Union for the Conservation of Nature and Natural Resources) widely known as World Conservation Union (WCU). The first Red Data Book Was compiled in 1991 and it is revised periodically.

Migration:-The moving of a bird or other animal from one place to another according to the season is called migration. It is the movement from one place to another in one season and return in different season. It can be regarded as an adaptation to escape the harsh and cold conditions ofnormal habitat in winter so as to survive. The birds which cover long distances to reach to other land are known as the migratory birds. The purpose of migration is:-

1. To escape bad weather conditions.
2. To find plenty of food and shelter.
3. To lay eggs (breeding).

India is one of the destinations of many of the migratory birds coming from the very cold regions of the earth. E.g. Siberian Crane which comes from Siberia and visits many areas in India such as Bharatpur in Rajasthan, Sultanpur in Haryana, some wet lands of North east. It stays here for a few months and then flies back to Siberia when the climate becomesfavourable.

Reforestation:-

The term 'reforestation' means to cover again with forest by planting new trees. It can be defined as a process of planting of trees in an area in which forests were destroyed. Forests are called green wealth of a country. If we have to retain our 'green wealth' for future generations, then planting of more trees (reforestation) is the only option. Reforestation can also take place naturally. If the deforested area is left undisturbed for some time, it re-establishes itself by the natural growth of trees. This is called natural reforestation. There is no role of human beings in natural reforestation.

Advantages of Reforestation

1. It produces a large quantity of raw materials for industry, timber trade etc.
2. It will lead to a decrease in global warming by reducing the amount of carbon dioxide gas in the atmosphere.

3. It increases rainfall in an area thereby raising ground water level and preventing droughts.
4. It prevents soil erosion and floods.
5. It increases the area of earth under forests which is good for the conservation of wildlife.

Forest Conservation Act

It is aimed at the preservation and conservation of natural forests and meeting the basic needs of the people living in or near the forests.This act was launched by the Government of India and forest department for the following purposes:-

1. To conserve forests as a natural heritage.
2. To control the movement of the forest products.
3. To control and regulate cattle grazing in the forests.
4. To create and manage reserved, protected and village forests.

Note: Satpura National Park is the first Reserve Forest of India.

Textbook exercises

1) Fill in the blanks

Do it yourself

2) Differentiate between the following:

a) Wildlife Sanctuary and Biosphere reserve: Refer to above Notes

b) Zoo and Wildlife Sanctuary: Refer to above Notes

*c) Endangered Species:*The species whose number is diminishing to a level that they might face extinction in near future are called endangered species.

*Extinct Species***:** The species whose numbers are nil (zero), because of changes in their habitat and other calamities.

d) *Flora***:** The plants that are found in a particular area are called flora for example, sal, teak, jamun etc.

*e) Fauna***:** The animals that are found in a particular area are called fauna. For example chinkara, cheetal, leopard etc.

Q3) Discuss the effects of deforestation on the following:

a) *WildAnimals***:** Deforestation leads to the change in the natural climate or habitat of the animals, so the species may become endangered and ultimately extinct in the near future.

b) *Environment***:** Deforestation increases the temperature and pollution level on the earth. It decreases the level of oxygen in the atmosphere and ground water level is

also lowered. The fertility of the soil will decrease and therefore the chances of natural calamities increase.

c) *Village (Rural areas)***:** Decline in rainfall causes decrease in soil fertility which can lead to lower agricultural production of crops in villages. The natural calamities like flood are also the effects of deforestation which adversely affect the villages.

d) *Cities (Urban areas)***:** Deforestation leads to global warming as carbon dioxide traps the heat of sun rays.With continuous global warming many glaciers may melt leading to drowning of many coastal cities.

e) *Earth*: Deforestation leads to soil erosion, change in the physical properties of the soil, removal of humus layer by which the hard and rocky layer exposes. All these ultimately convert the fertile land into desert.

f) *The Next Generation:*Deforestation shows the ugliest face to the survival of next generation with problems at every step in their survival. Next generations may have to face unusual weather changes. Health of future generations may be badly hit due higher pollution levels caused by deforestation. Deforestation may also lead to food scarcity for future generation.

Q4) What will happen if

a)If we go on cutting trees, then:

1. Survival of the mankind will face a threat, because of low oxygen concentration.
2. We will have to face high temperature and pollution level.
3. Natural calamities will occur. ,
4. The water cycle will be disturbed.

b)The habitat of an animal is disturbed.

1. The animals will lose their natural habitat and ultimately will come at the periphery to become endangered
2. The survival of animal will be difficult, because of the drought and the rise in temperature.

c)The top layer of soil is exposed

i) The exposed top layer looses all its nutrients.

ii) Decrease in the water holding capacity of the soil.

iii) Vegetation will go off from the field and desertification will be the result.

Q5) Answer in brief:

1. *Why should we conserve biodiversity?*
    a. Biodiversity refers to the variety of life existing on earth, their inter relationships and their relationship with the environment. If we do not conserve biodiversity ,the food chain will get disturbed and the whole ecosystem will be affected.
2. *Protected forests are also not completely safe for wild animals. Why?*
    a. Protected forests are also not completely safe for the wild animals because poaching or capturing of the animals is easy for the people living in the neighbourhood.
3. *Some tribals depend on the jungle. How?*
    a. Tribals are dependent on jungles for the fulfillment of their daily needs of life. They feed themselves from the different types of vegetation found in jungles and by hunting the wild animals of the jungle.
4. *What are the causes and consequences of deforestation?*
    Refer to Notes.
5. *What is Red Data Book?*
    Refer to Notes
6. *What do you understand by the term migration?*
    Refer to Notes
7. *In order to meet the ever-increasing demand in factories and for shelter, trees are being continually cut. Is it justified to cut tree for such projects? Discuss and prepare a brief report.*
    a. It is not at all justified to cut trees for just to fulfill our demand, because cutting of trees has more disastrous effect than the benefit we will get from cutting those. (students should elaborate and prepare a brief report as asked in the question based on their understanding of the above notes)
8. *How can you contribute to the maintenance of green wealth of your locality? Make a list of actions to be taken by you.*
    a. To maintain the green wealth in my locality, the different actions that can be takentaken are:
        i. Not to allow anybody to cut any trees

ii. Always try to plant saplings in my area

iii. Never neglect the watering of plants

iv. Always trimming the plants time to time for their better growth.

9. *Explain how deforestation leads to reduced rainfall.*
   a. Deforestation leads to reduced rainfall because when the plants/trees transpire, then only the ground water turns into water vapour and goes upward and makes the clouds which are the basic reason for rainfall
10. *Find out the information about national parks in your state. Identify and show their location on the outline map of India.*
    a. Dachigam National Park and Kishtawar High Altitude National Park.
11. *Why should paper be saved? Prepare a list of ways by which you can save paper?*
    a. Paper should be saved for the following reasons:

    a) A large number of trees can be saved by saving paper this can check deforestation.

    b) Saving paper also saves energy and water needed for manufacturing paper.

    c) Amount of harmful chemicals used in paper making will be reduced by saving paper. The ways to save paper are:

    1) Economical use of paper.
    2) Recycling of paper should be done.
    3) Paper should not be burnt.

12. *Complete the word puzzle***:**

Do it yourself

Topic: Force and Pressure

Force: Any push or pull is called force. Force is a vector quantity i.e. it has magnitude as well as direction. It is measured in Newton's. Force can be balanced or unbalanced. It is the unbalanced force which makes the objects move.

Three cases arise when two or more forces act on an object:

a. If two or more forces act on an object in the same direction they add up.
b. If two or more unequal forces act on an object in opposite direction, they get subtracted.
c. If equal and opposite forces act on an object, they cancel each other and the net (total) force acting on the object is zero.

Scalarquantity: A physical quantity which has magnitude but no direction is called a scalar quantity. e.g. mass, distance, speed etc

Vectorquantity: A physical quantity which has magnitude and direction is called a vector quantity. e.g.displacement, weight etc.

Effects of force: The various effects of force are:

1. Force can stop moving objects.
2. Force can change the state of motion of an object.
3. Force can change the direction of an object. If the force is in the same direction as that of the object, speed increases. If the force is in the opposite direction, speed decreases.
4. Force can change the shape and size of an object.

Types of forces: There are two types of forces:

1. Contact force
2. Non-contact force

Contact force: The forces which need a physical contact between the source of the force and the object are called contact forces. Frictional force and muscular force are examples.

Frictional force: It is a type of contact force which comes into play when there is a relative motion between two objects. The two objects are in physical contact with each other e.g. a ball rolling on ground stops due to frictional force between the ball and the ground.

Muscular force: The force exerted by the muscles of our body is called muscular force. It is a type of contact force i.e. a physical contact is necessary between us and the object e.g. lifting a book from a table or kicking a football etc.

Non contact force: The forces which do not need a physical contact between the source of the force and the object are called non-contact forces. Gravitational/ Magnetic/Electrostatic forces are examples. On contact forces are also known as Action at a distance force.

Electrostatic force: It is a type of non-contact force which exists between the charges at rest. Charges are of two types viz positive and negative. Like charges repel each other while unlike charges attract each other. e.g. A comb rubbed with dry hair can attract small pieces of paper without having a physical contact with the bits.

Magnetic force: It is a type of non-contact force which acts between magnets and magnetic material. This force acts at a distance and can be attractive as well as repulsive. All magnets have two poles, North Pole and South Pole. Like poles repel each other while unlike poles attract each other.

GRAVITATIONAL FORCE: - It is a universal force which is always attractive in nature. It is a non-contact force in which Earth attracts other objects towards itself. It is responsible for rainfall, snowfall, formation of solar system, etc.

Pressure

The force acting per unit area is called pressure. It is a scalar quantity and has wide applications in our daily life.

P= FORCE/AREA

Pressure depends on two quantities… Force and Area. Pressure is directly proportional to force i.e. more the force more will be the pressure. Pressure is inversely proportional to area i.e. more area less pressure and vice versa.

Pressure is measured in Pascal's. 1 Pascal is 1 newton/ 1 metre^2.

1 Pascal is defined as the pressure acting on a body when 1 newton of force acts on 1m^2 of the area of the body. Besides bar, millbar and torr are other units of measuring pressure.

1 BAR = 10^5 PASCAL 1 MILLIBAR = 10^2 PASCAL 1 TORR = 133 PASCAL

APPLICATIONS OF PRESSURE:-

i. Straps of bags are made wider to minimize pressure on our shoulders. Since, pressure force / area, pressure is inversely proportional to area, so making the straps wider reduces pressure.
ii. The tyres of tractor are made broad so as to reduce pressure exerted by tyres on the soil.
iii. The tip of the needle of a sewing machine is pointed so as to reduce the area of contact between the needle and the cloth and hence increase pressure.
iv. It is easier to walk on sand with flat shoes than wearing heels because the area of contact in the first case is more thereby creating less pressure.
v. It is easier to cut things using sharp knife than a blunt one because area of contact for a sharp knife issmaller due to which pressure is more.

LIQUID PRESSURE: - Liquids exert pressure and there are certain properties of liquid pressure.

a. Liquid pressure increases with the increase in depth. This property is applicable in the construction of dams where the base of the dam is made broader to resist high pressure.

b. Liquids exert equal pressure in all directions. Liquid pressure at two points within same vessel at the same depth is same.

c. Liquids transmit pressure.

PRESSURE EXERTED BY GASES:-

All gases like hydrogen, helium, etc. exert pressure. Air is a mixture of gases and hence it also exerts pressure. Pressure due to a gas is because of the collisions occurring between the gas molecules and the walls of the container. E.g. when we blow air in a balloon, it inflates due to pressure exerted by the airmolecules on the walls of balloon. Similarly air pressure is responsible for the inflation of the vehicles.

ATMOSPHERIC PRESSURE:-

The pressure exerted by the atmosphere of the earth is called atmospheric pressure. The atmosphere extends up to 300 km and includes various layers like stratosphere, troposphere, etc. The upper layers of the atmosphere exert pressure on the layers below them. The atmospheric pressure is maximum at sea level. Its value is 101.3 Pascal or 760mm of hg. The earth's gravitation pulls the atmospheric layerstowards itself due to which the lower atmospheric layers are denser than the upper ones.The upper layers of the atmosphere exert lesser atmospheric pressure than the lower ones. Our body does not feel atmospheric pressure because it is exactly counter balanced by the blood pressure of our body.

APPLICATIONS OF ATMOSPHERIC PRESSURE:-

1. *Drinking water through straw*: - We are able to drink water due to atmospheric pressure. When wesuck through the straw, pressure in the straw decreases but the pressure over the liquid is high andis equal to atmospheric pressure. Due to this difference in pressure, water is forced into the straw.
2. *Rubber dropper*: - It also works due to atmospheric pressure. When we press the dropper, air inside the dropper comes out in the form of bubbles in liquid. Due to atmospheric pressure, liquid is forced into dropper.

3- *Syringe*: - Liquid is filled in the syringe with the help of atmospheric pressure. When the syringe is pumped, air is forced out of it. Due to more air pressure on the liquid surface, liquid is sucked in. Fountain pens are refilled in the same way.

4. *Rubbersucker*: - It is a device which gets stuck to wall firmly. It is a hemispherical device, whichwhen stuck with the wall has a vacuum (partial vacuum) created within it. Since atmospheric pressure outside is high it pushes it with great force. Due to this force, rubber sucker remains attached to the walls. It can be used as hanger in shops or homes.

Textual Questions(Answers only):

1. The two examples in which we push or pull to change the state of motion are:-
   a. We can stop a moving ball by placing our hand in its path.
   b. We can set a tyre in motion or increase its speed by pushing it in the direction of motion.
2. The two examples in which applied force causes a change in the shape of an object are:-
   a. By pressing a lump of dough on a plate.
   b. By hanging a rubber band suspended from a hook fixed on a wall.
3.
   a) Apply force (pull)
   b) Attract
   c) Push
   d) Repel
4. a) Shape (b) Muscular (c) Contact (d) Gravity and friction
5.

Agent exerting force	*Object on which force is exerted*	*Effect of force*
Force is exerted by our fingers	On lemon	The shape of lemon changes
Fingers	On toothpaste	The shape again changes
Suspended load	Spring	The spring gets deformed
The athlete	On the ground	The muscle gets stretched and compressed

6. A blacksmith hammers a hot piece of iron while making a tool in order to shape up the piece of iron. Here the muscular force exerted by the blacksmith changes the shape of the piece of iron and he can make tools of it.

7. When we rub a balloon with a piece of cloth, both the balloon and the cloth gets charged, so the balloon gets sticked to the wall due to the charge on the balloon, hence it is an example of electrostatic force.

8. Gravitational force and muscular force are the two forces which act on the bucket. These forces don't change the state of the bucket because they are in

balanced condition, hence the bucket doesn't change the state of the bucket because they are in balanced condition, hence the buckets don't move.

9. The two forces acting on the rocket are gravitational force and friction due to air.

10. Atmospheric pressure.

TOPIC 3: Mineral and Power resources **geo. Term-1**

1. **Name any three common minerals used by you every day.**
   a. Common salt b) graphite c) Gypsum d) Petroleum
2. **What is an ore? Where are the ores of metallic minerals generally located?**
   a. A naturally occurring material from which a metal or valuable mineral can be profitably extracted is called an ore. Ores of metallic minerals are generally located in areas composed of igneous rocks.
3. **Name two regions rich in natural gas resources.**
   a. Russia, U.K, Netherlands and Godavari- Krishna delta are rich in natural gas resource.
4. **Which sources of energy would you suggest for:**
   a) Rural areas →Fire wood
   b) Coastal areas→ Wind and tidal energy
   c) Arid areas →Solar energy
5. **Give five ways in which you can save energy at home.**
   a. We can save energy in homes with the help of following ways:-
      i. Switching off the appliances when not in use.
      ii. Minimal usage as per requirement.
      iii. Maximizing the use of natural breeze and light by keeping the windows open.
      iv. Keeping the lights dust free.
      v. By using energy efficient devices

Q) Give reasons- why?

i) Environmental aspects must be carefully looked into before building huge dams.
Ans. It is necessary to take environmental aspect into consideration before constructing large dams because a large dam can turn surrounding areas into marshy land, large dam can cause floods in lower course of river. It also causes earthquakes and silting of lakes. Thus a large dam must be constructed at appropriate site in order to maintain ecological balance.

ii) Most industries are concentrated around coal mines.
Ans. Most of industries are concentrated around coal mines because coal is used as a major power source for industries. Thus, it is better to establish industries near coal mines.
iii) Petroleum is referred to as black gold.
Ans. Petroleum is often referred to as "black gold" because like gold it is considered as an important economic asset. It plays a vital role in economic development of country as it is used in industries, transportation and generation of thermal power.
iv) Quarrying can become a major environmental concern.
Ans. Quarrying means extraction of those minerals which lie near earth's surface. It can become a major environmental concern as it destroys top soil which is abode of various micro organisms. It also affects growth of vegetation. The pits and holes formed during quarrying can contaminate whole ground water. It also produces lot of dust and smoke which causes air pollution.

Q Distinguish between:

Conventional energy	Non- Conventional energy
These sources are those energy sources which we have been using since earlier times.	Those sources of energy are which we haverecently developed.
They cause more pollution.	They cause less pollution..
Most of them are renewable, e.g. wood, coal, etc.	Most of them are non- renewable e.g. tidal energy, wind energy etc.

Bio gas	Natural gas
It is a gas which is obtained by artificial process.	It is gas which is formed due to natural process.
It is listed as conventional source of energy.	It is listed as non-conventional source of energy

It is formed near or over the earth's surface.	It is found when decomposing plants and animals are exposed to intense heat and pressure under the earth surface.
It is generally used for domestic purpose.	It is used for domestic as well asindustrial purpose.

Metallic minerals	**Non-Metallic minerals**
Minerals containing metals in raw form are called metallic minerals.	Minerals which do not contain metals are called non-metallic
They are good conductors of heat and electricity e.g. copper	They are bad conductors of heat and electricity e.g. coal, limestone
They are hard and conduct heat and electricity	They are soft and do not conduct heat and electricity
They have a characteristic luster or shine.	They are dull.

Ferrous minerals	**Non-ferrous minerals**
The metallic minerals which contain iron in them are called as ferrous minerals.	The metallic minerals which do not contain iron in them are called as non-ferrous minerals
They show characteristic magnetic properties. Examples are iron ore.	They do not have magnetic properties. Examples are gold ore, silver ore, ores of lead, etc.

Lesson No. 03 Ruling the Countryside

Q1: Describe the main features of the Permanent settlement.

Ans: In order to get stable revenue income the company introduced the permanent settlement in 1793. The aim of this settlement was to ensure the regular flow of revenue for the company. According to the terms of settlement, rajas and taluqdars were recognized as zamindars. They were asked to collect rent from the peasants and pay revenue to the company. The amount to be paid was fixed permanently i.e it was not to be increased ever in the future. If the zamindars failed to pay the revenue, they lost their zamindari.

Q2: Give two problems which arose with the new Munro System of fixing revenue.

Ans: Under the new Munro system of fixing revenue, the revenue officials fixed very high revenue demand. This demand could not be met by the peasants. Consequently, the peasants fled the countryside and the villages became deserted in many regions.

Q3: Why were ryots reluctant to grow indigo?

Ans: Under the ryoti system, the Indigo planters forced the ryots to sign an agreement or contract. Those who signed the contract got cash advances to low rates of interest to produce Indigo. The loan committed the ryots to cultivate Indigo on at least 25% of the area under his holding. On delivering the crop to the planter, the ryot was given a new loan and the cycle started again. The price that they got from the planters for the Indigo was very low. Besides, the planters insisted the peasants to cultivate Indigo on the most fertile parts of their holding but peasants preferred growing rice on their best soils. The reason for not growing Indigo was the deep roots exhausted the soil rapidly. So, after an Indigo harvest, the land could not be used for sowing rice. Therefore, due to these factors, the ryots were reluctant to grow Indigo.

Q4: What were the circumstances which led to the eventual collapse of Indigo production in Bengal?

Ans: The Indigo ryots of Bengal felt that they had the support of local Zamindars and Village Headmen in their struggle against the forceful and oppressive methods of the Indigo planters. These Zamindars were unhappy with the increasing power of the planters to give them land on long leases. Moreover, in many villages, the village headmen mobilized the Indigo peasants and fought fierce battles with the lathiyals. Many intellectuals supported the ryots by writing about their misery, the tyranny of planters and horrors of the system. In march 1859, thousands of ryots refused to grow Indigo. Worried by the rebellion, the government setup the Indigo

commission to inquire into the system of Indigo production. The commission held the planters guilty. It declared that Indigo cultivation was not profitable for the ryots and that after fulfilling their existing contracts,they could refuse to produce Indigo in future. Consequently, the Indigo production collapsed in Bengal.

Q5: How was the Mahalwari system different from the permanent settlement?

Ans:

Mahalwari System	Permanent settlement
It was devised by Holt Mackenzie. It came into effect in 1822. In the North Western provinces of the Bengal Presidency.	It was introduced in 1793 by Lord Cornwallis.
The Village headmen were incharge of collecting revenue.	The Rajas and Taluqdars were incharge of collecting revenue.
The revenue amount wasn't fixed and was to be revised periodically.	The revenue amount was fixed and was never to be increased in the future.

Topic: Tribals, Dikus and the vision of a Golden Age.
Lesson: 04

Q1: What problems did shifting cultivators face under British rule?

Ans: The shifting cultivators faced the following problems under the British rule:-

1. They had to give up shifting cultivation in various areas to settle down at one place.
2. They faced various serious difficulties while cultivating on mountainous land.
3. The shifting cultivators who took cultivation suffered with less agriculture produce.
4. They were forced to move to other areas in search of their livelihood. Those who were allowed to practise with shifting cultivation were slapped with high taxes.

Q2: How did the powers of tribal chiefs change under colonial rule?

Ans: The tribal chiefs were important persons who enjoyed the certain amount of economic and political power in their respective tribes. They had the right to control and administrate their territories. Under the British rule, their function and powers got reduced. They lost much of their powers and were forced to obey the British laws. They also had to pay the annual tributes to the British government.

Q3: What was Birsa' vision of golden age? Why do you think such a vision appealed to the people, of the region?

Ans: Birsa thought of the golden age of the past as Satyug (The age of truth) Mundas lived a prosperous life and lived on tribal agriculture. They lived a peaceful life along with different plans of the tribe without any conflict.

The vision of satyug appealed the minds of common people because it gave them a hope of living peacefully within their tribe. They wanted to free themselves from the oppression of British government and local landlords.

Q4: What accounts for the anger of the tribals against the dikus?

Ans: Tribals were angry with dikus because of the changes they were experiencing and the problems they were facing under British rule. Their familiar ways of life seemed to be disappearing.Their livelihoods were under threat and their religion appeared to be in danger.

Topic 4:UNDERSTANDING LAWS

Question 1.
Write in your own words what you understand by the term the 'rule of law'. In your response include a fictitious or real example of a violation of the rule of law.
Solution:
Law is a system of rules, usually imposed through a Government or Institution and is applied to govern a group people. It shapes politics, economics and society in numerous ways.
The most common example of a violation of the rule of law can be seen on the roads. Motorists and pedestrians do not follow the traffic rules.
Motorists do not adhere to speed limits nor do they stop behind the line at traffic signals. Pedestrians rarely use the zebra crossing and cross the road at will causing harm not only to themselves but also to other road users.
Question 2.
State two reasons why historians refute the claim that the British introduced the rule of law in India.
Solution:
Historians refute the claim that the British introduced the rule of law in India because colonial law was arbitrary, and the Indian nationalists played a prominent role in the development of the legal sphere in British India.
Question 3.
Re-read the storyboard on how a new law on domestic violence got passed. Describe in your own words the different ways in which women's groups worked to make this happen.
Solution:
Domestic violence against women was very common in India in the early 1990s. Throughout the 1990s, the need for a new law was raised in different forums like Public Meeting and women's organizations. In 1999, Lawyers Collective, a group of lawyers, law students and activists, after nation-wide consultations took the lead in drafting the Domestic Violence (Prevention and Protection) Bill. This draft bill was widely circulated. Meetings were held all over the country supporting the introduction of this Act.
The Bill was first introduced in Parliament in 2002, but it was not to the satisfaction of all. Several women's organizations, like the National Commission for Women made submissions to the Parliamentary Standing Committee requesting changes in the Bill. In December 2002, after reviewing the request made by the National Commission for Women, the Parliamentary Standing Committee submitted its recommendations to the RajyaSabha and these were also tabled in the

LokSabha. The Committee's report accepted most of the demands of the women's groups.
Finally a new Bill was reintroduced in Parliament in 2005. After being passed in both houses of Parliament, it was sent to the President for his assent. The Protection of Women from Domestic Violence Act came into effect in 2006.

Question 4.

Write in your own words what you understand by the following sentence on page 44-45: They also began fighting for greater equality and wanted to change the idea of law from a set of rules that they were forced to obey, to law as including ideas of justice.

Solution:

The Sedition Act of 1870 was a turning point in the struggle for freedom in India. According to the Sedition Act any person protesting or criticizing the British government could be arrested without due trial. Indian nationalists began protesting and criticizing this arbitrary use of authority by the British. They also began fighting for greater equality and wanted to change the idea of law from a set of rules that they were forced to obey, to law as including ideas of justice.
By the end of the nineteenth century, the Indians started asserting themselves in the colonial courts. The Indian Legal profession began emerging as a force to reckon with and the Indians demanded respect in the courts. Indians started using law to defend their legal rights. Indian judges began to play a greater role in making decisions.
Thus the Indians played a major role in the evolution of the rule of law during the colonial period.

TOPIC5: Judiciary

Q1:You read that one of the main functions of judiciary is upholding the laws and enforcing fundamental rights. Why do you think an independent judiciary is necessary to carry out this important function?

Ans. It is necessary to have an independent judiciary to carry out the basic functions of "upholding the law and enforcing fundamental rights "because the independence of judiciary is an integral part of democracy. It intends to shield the judicial process from external influences.It provides full legal protection to all individuals going to court for whatever reasons.Also,any citizen can approach the court of law if his/her fundamental rights are violated, without fear of disputes being solved in favor of those in power.

Q2. Re - read the list of fundamental rights provided in chapter 1. How do you think the right to constitutional remedies connects to the idea of judicial review?

Ans. The right to constitutional remedies connects to the idea of judicial review in its capacity of protecting the rights of an individual against the working of the state legislature or executive. Judicial review of the court decisions are carried out when the judgementgiven by a court violates any constitutional provision . In the constitution, every citizen has equal rights and none can be discriminated against other. If there are any violations, the judiciary is free to review the earlier judgments even by the supreme court.

Q3.In the following illustrations, fill in each tier with the judgements given by the various courts in Sudhagoel case.

Ans. Lower court: Laxman, his mother Shakuntala and his brother- in- law Suhhash Chandra were sentenced to death.

High court: Laxman. Shakuntala and Subhash Chandra were acquitted.

Supreme court: Laxman and Shakuntala were given life imprisonment, while subhash Chandra was acquitted for lack of sufficient evidence.

Q4. Keeping the SudhaGoel case in mind , tick the statements that are true and correct the ones that are false:

Ans. a) True

b) False. The supreme court is the highest court of the country and thus, its decision is final. Hence, they went to the high court after the trial court had given its decision.

c) False. If they don't like the supreme court verdict, the accused cannot go back again to the trial court because the supreme court is the highest court in the judiciary pyramid.

Q5. Why do you think the introduction of public interest litigation (PIL) in the 1980s is a significant step in ensuring access to justice for all?

Ans. The introduction of public interest litigation (PIL) in the 1980s was a significant step in ensuring access to justice for all because during that time the filling of the litigation was very costly. The poor who used to earn daily wages for their living could not attend the hearings as it would take up a lot of time.

This helped the poor as it allowed any individual or organization to file a PIL in the high court or the supreme court on behalf of those whose rights were being violated.

Q6. Re-read excepts from thejudgement on the Olga Tellisvs Bombay Muncipal Corporation case. Now write in your own words what the judges meant when they said that the right to livelihood was a part of the right to life.

Ans. In the Olga Tellis vs. Bombay Municipal corporation case, the judges stated that right to livelihood was a part of the right to life because no one can stay without the means of livelihood.If the right to livelihood is not included in the constitutional right to life, the easiest way of depriving a person of his right to life would be to deprive him of his means of livelihood. Such deprivation would make life impossible to live.

Q7. Write a story around the theme, justice delayed is justice denied?

Ans. NitinNarang was a bank officer. After retirement he came back to his fore father's house. He requested the tenant to vacate the house. Tenant challenged that if NitinNarang wanted to have his house vacated,he should move to court for justice. He was compelled to live in a rented house. The owner lodged litigation against the tenant. After fighting the case for five years, the owner won the case. The decision was made in his favor by the trial court. But the tenant appealed in the high court against the lower court decision. It again took five years for justice. In the meantime NitinNarang kept on living in the rented house because unless there was judgement, he had no other option. In such a situation we can definitely say,' justice delayed is justice denied.'

Q8 . Make sentences with glossary words .

Ans. a) Acquit : The case in favor of Manish led the high court to acquit him of all charges of guilt that the trial court had levied on him.

b) To appeal. The women's organization lent strong support to the domestic maid to appeal against charges of theft that her employer had accused her of.

c). Compensation. The central government paid compensation to the victim's family after an unfortunate train accident that killed hundreds.

d). Eviction. The company's claim to land occupied by slum dwellers led to the poor peoples Eviction from their homes, which were bulldozed by Municipal authorities.

e).violation . The judiciary takes stringent action against any violation of fundamental rights.

Q9 .The following is a poster made by the right to food campaign. Read this poster and list the duties of the government to uphold the rights to food. How does the phrase "Hungry stomachs, overflowing godowns! We will not accept it !!" Used in the poster relate to the photo essay on the right of food on page 61.
Ans. The constitution of India grants all Indian the right to live .Right to live is associated with the right to food.
The duties of the government to uphold the right to food are as follows:
To provide at least minimum food stuff to the citizens at normal cost or free.
To check unnecessary inflation in price of food items.
To check the hoarding of grains of daily use like wheat, rice, sugar etc.
To provide meal to poor children in the school.
Hungry stomachs, overflowing godowns "is not at all acceptable in a civilized society. If the hoarding of food is not discouraged, the people with hungry stomachs will attempt to commit crimes.

TOPIC 6:Understanding our criminal justice system.

Q1.In a town called peace land, the supporters of the Fiesta football team learn that the supporters of the jubilee football team in the nearby city about 40km away have damaged the ground on which the final between both teams is to be held the following day. A crowd of Fiesta fans armed with deadly weapons attack the homes of the supporters of the jubilee football team in the town. In the attack, 10 men are killed, 5 women are gravely hurt ,many homes are destroyed and over 50 people injured.
Imagine that you and your classmate are now part of the criminal justice system. First divide the class into four groups of persons.
1.Police
2. Public Prosecutor
3. Defence lawyer
4. Judge
The column on the right provides a list of functions. Match these with the roles that are listed on the left. Have each group pick the functions that it needs to perform to bring justice to those who were affected by the violence of the Fiesta fans.In what order ,will these functions be performed.
Ans. Police, public Prosecutor, Defence lawyer and judge will perform their functions in following order.
Police:- Arrest the Fiesta fans.
Take photographs of burnt homes.
Record the statements of witnesses.

Get the assaulted women medically examined.
Public Prosecutor:- cross examine the witness.
Argues the case of victims.
Defence lawyer:- Meets the accused persons .
Examines the witnesses in court.
Judge:- Hears the witnesses.
Records the evidence.
Writes thejudgement.
Decides for how many years the accused will be put in jail.
Passes thejudgement.
Conducts a fair trial.
The victims would not get justice if only one person performs all the functions of the criminal justice system because he could get influenced by various prejudices. A separation of powers is necessary within a judicial system too,since absolute power can lead to unfairness. A single ideology may not be the right one, as it can affect the trial and the result of the case.

TOPIC 2: UNDERSTANDING SECULARISM

Q1. List the different types of religious practice that you find in your neighborhood. This could be different forms of prayer, worship of different gods, sacred sites, different kinds of religious music and singing etc. Does this indicate freedom of religious practice?
Answer: The different types of religious practices that we can see in our neighborhood are as follows:
1. A Sikh person worships in Gurduwara to Guru Nanak using Guru Granth Sahib
2. A Muslim worships in a mosque and their sacred book is the Quran.
3. A Christian worships Jesus Christ in a Church and their religious book is the Holy Bible.
4. A Hindu worships in a Temple to the idols of Gods and Goddess.
This shows that the people in India have the freedom to practice the religion of their choice and yet live together in peace and harmony.
Q2. Will the government intervene if some religious group says that their religion allows them to practice infanticide? Give reasons for your answer.
Answer: Yes, the Government can intervene if some religious group says that their religion allows them to practice infanticide. This is because the Indian Constitution clearly states that the Government has the right to intervene if there is a threat to social harmony. Also, killing an infant is a crime and the judiciary is the only authority that can punish a person to death and no other religion or person can commit the crime of killing someone.

Q3. Complete the following table:

Objective	**Why is this important**	**Example of violation of this objective**
One religious community does not dominate another	To protect the freedom of religion which is a fundamental right.	The killing of cattle traders in Rajasthan suspecting that they were carrying beef.
The state does not enforce any particular Religion nor take away the religious freedom of individuals.	To maintain separation of religion from sectoral state	In 2004,people were banned from wearing head scarves or turbans in public places by the French government.
That some members do not dominate other members of same religious community.	Freedom of religion based on the principle of equality	Islam is divided into sunni andshia sects. In many Islamic countries shias are opperessed by sunnipeople .

Q4. Look up the annual calendar of holidays of your school. How many of them pertain to different religions? What does this indicate?
Answer: The annual calendar of our school marks holidays like Eid, which is celebrated by Muslims. Diwali, which is a Hindu festival, Christmas, which is celebrated by Christians and Guru NanakJayanti which is a Sikh festival. This proves that India is a secular country and every individual has the right to religious freedom.
Q5. Find out some examples of different views within the same religion.
Answer: Some examples of different views within the same religion are as follows:
1. Hindus worship different idols of Gods and Goddesses.
2. Muslims are divided into Shia and Sunni. Both these sects have different views on a lot of issues.
3. Buddhist followers are divided into Mahayan and Hinyan

Q6. The Indian State both keeps away from religion as well as intervenes in religion. This idea can be quite confusing. Discuss this once again in class using examples from the chapter as well as those that you might have come up with.
Answer: The Indian state both keeps away from religion, as well as intervenes in religion because on one side Indian laws say that the issues of religious importance have to be dealt as per the laws of that particular religion but at the same time the religious laws and issues like Triple Talaq were recently modified or abolished by Indian judiciary violating the Muslim sharia law.

Topic 3: why do we need a parliament

Q1: Why do u think the nationalist movement supported the idea that all adults have a right to vote?
Ans: The nationalist movement supported the idea that all adults have a right to vote because everyone in the country is a part of society and should have a chance to contribute towards the working of the country or the government.It would allow people to create and rectify their governments in the way in which they want the country to run. Law making and decision making should be shared by all the people of the country.

Topic5: When People Rebel 1857 and After **Sub: History**

Textual Questions

Q1: What did the British do to protect the interests of those who converted to Christanity?

Ans: British protected the interests of those who converted to Christianity by passing the law in 1850 CE. This law allowed an Indian who had converted to Christianity to inherit the properly of his ancestors which was not allowed earlier.

Q2: What objections did the sepoys have to the new cartridges that they were asked to use?

Ans: In 1856 CE. Indian soldiers were given new greased cartridges which were to be touched with one's teeth before they could be fired. It was suspected that these cartridges were coated with fat of cows and pigs. This enraged both Hindu and Muslim solidiers and they refused to use those cartridges.

Q3: How did the last Mughal emperor live in the last years of his life?

Ans: The last years of the last Mughal emperor, Bahadur Shah Zafarwere miserable. He was captured and was held guilty in the court. He was sentenced to life imprisonment. He and his wife Begum ZinatMahal were sent to the prison in Rangoon in October, 1858 and he died in Rangoon Jail in 1862.

Q4: What was the demand of RaniLakshmibai of Jhansi that was refused by the British?

Ans: RaniLakshmibai of Jhani wanted the company to recognize her adopted son as the heir to the kingdom after the death of her husband.

Q5: What impact did Bahadur Shah's support to the rebellion have on the people and the ruling families?

Ans: Bahadur Shah Zafar's support to the rebellion had great implications. He wrote letters to all the chiefs and rulers of the country to come forward and organize a confederacy of Indian states to fight the British. Most rulers of smaller provinces and chieftains felt that if the Mughal emperor could rule again, they would be able to rule their own territories once more under the Mughal authority and ensure their participation in the revolt which the British had not expected to happen. But Bahadur Shah Zafar's decision to bless the rebellion changed the entire situation. It provided courage, hope and confidence to the people to act against the British.

Q6: How did the British succeed in securing the submission of the rebel landowners of Awadh?

Ans: British made various policies to protect landlords and zamindars. They gave them security of rights over land. Landholders were allowed to enjoy the hereditary rights over their lands. Those who had rebelled were told that if they would submit to British and ifthey had not killed any white people, then they would remain safe and their claims and rights to land would not be denied. In this way British succeeded in securing the submission of the rebel land owners of Awdh.

Q7: In what way did the British change their policies as a result of the rebellion of 1857?

Ans: The revolt of 1857 marks a watershed in the modernization of India. British introduced a number of changes in India which were as under:-

1. The British Parliament passed a new Act in 1858 and transferred the powers of east India company to British crown inorder to ensure for a more responsible management of the Indian affairs. A member of British cabinet was appointed as the secretary of state for India and was made responsible for all the matters related to the governance of India.
2. The Governor-General of India was given the title of Viceroy i.e. a personal representative of the crown.
3. It was decided that the proportion of Indian soldiers in the army would be reduced and the number of European soldiers would be increased. It was also decided that instead of recruiting solidiers from Awadh, Bihar, Central India and South India, more soldiers would be recruited from among the Gurkhas, Sikhs and Pathans.
4. The British decided to respect the customary religious and social practices of the people in India.
5. Policies were made to protect landlords, Zamindars and give them security of right over their lands.
6. A council of 15 members known as Indian council was made to advise the secretary of the state for India.
7. The policy of annexation was stopped. All the ruling chiefs were allowed to pass their kingdoms to their adopted sons.
8. A hostile policy was adopted towards the Muslims and their land and property was confiscated.

Q8..What could be the reason for the confidence of british rulers about their position in India before May 1857?

Ans: The reason for the confidence of the British ruler about their positions in India before May 1857 are:

1.In the mid of 18thcentury ,the power of nawabs , rajas, zamindars etcwere eroded.

2.The freedom of the Indian rulers was reduced .Their armed forces were disbanded and their revenue and territories were taken away.

3.Indianprinces and chiefs whom the Britishallowded to continue used to side with the British during revolt before May 1857.

4. Residents had been stationed in many courts by the Britishers as their representatives.

5.These residents kept informing the governor about important developments in every kingdom.

So the british were very confident that their positions in India was very strong and no one could challenge them.

Topic6 : Weavers, Iron Smelters and Factory Owners.

Q1:What kinds of cloth had a large market in Europe?

Ans: The Indian textiles of fine qulity chintz muslin etc were in great demand in Europe and markets. They were manufactured on handlooms with fine craftsmanship.

Q2: What is Jamdani?

Ans: Jamdani is a fabric of fine muslin manufactured in India. A combination of cotton and gold threads was woven on a handloom. It is generally white or grey with decorative designs.

Q3: What is Bandanna?

Ans: The term Bandanna is derived from a Hindi word "Bandhna" which means to tie. It refers to a brightly coloured fabric produced through the method of tie and dye. It is used as heads scarf or worn around neck.

Q4: How do the names of different textiles tell us about their histories?

Ans: The history of flourishing trade and craftsmanship of India is preserved in many words used in English and many other languages.When we trace the orign of these words we come to know that almost all of them were derived from the local Indian names. These words depict the popularity of Indian textiles in the western markets. The meaning of following words can be traced from the Indian history.

1. "Calico" derived from "Calicut"
2. Bandanna derived from Bandhna.
3. Chintz derived from Chinnt.
4. Muslin derived from Mosul.

Q5: How did the development of cotton industries in Brittian affect textile producers in India?

Ans: As the cotton industries in Britain developed it affected textile producers in India in several ways. First Indian textile now had to compete with British textiles in the European and American markets. Second, very high duties were imposed on Indian textile making its import into Britain difficult.

With the beginning of the nineteenth century English made cotton textile successfully ousted Indian goods from their traditional markets in Africa, America and Europe. Thousands of weavers in India were now thrown out of employment.

Q6: Why did the Indian iron smelting industry decline in the nineteenth century?

Ans: The Indian iron smelting industry declined in the nineteenth century because of the following reasons:

1. The iron smelters could not get firewood for the furnaces from the local forests. This was because under the new forest laws they were prevented to enter the forests.
2. The smelters had to pay high taxes to carry on their smelting work.
3. The Indian ironsmiths began to use the imported iron from Britain which reduced demand for local iron.

Q7: What problem did the Indian textiles industry face in the early years of its development?

Ans: The Indian textile industry faced following problems in the early years of its existence:

1. It had to complete with the cheif textiles imported from Britain.
2. The textile mills were imposed heavy taxes and import duties.

3. The amount of exports was also restricted which decreased the profit of Indian industry.

Q8: What helped TISCO expand steel production during the First World War?

Ans: In 1914, the First World War broke out which created a large demand for war related goods. Britain now had to meet the demands of war in Europe which dramatically declined the imports of British steel into India. The newly introduced Indian railway industry turned to TISCO for the supply of rail. This resulted in the expansion if TISCO steel production which became the biggest industry in British India.

Q9: Who are the Agaria?

Ans: Agaria are the community of iron smelters living in central India. They are specialised in the craft of iron smelting.

Q10: Why did the wool and silk producers in England protest against the import of Indian textiles in the early eighteenth century?

Ans: By the early eighteenth century, Indian textiles were very popular in England. At this time textile industries had just begun to develop in England. Unable to complete with Indian textile, English producers wanted a secure market within the country by preventing the entry of Indian textiles. So, the wool and silk makers in England began protesting against the import of Indian textiles. Then in 1720, the British government enacted a legislation banning the use of Chintz in England.

Topic: Agriculture

Term 1

Q1)**What is a Agriculture?**

A. The cultivation of crops both food non-food crops , rearing of animals, forestry and fishing is called agriculture. The word agriculture has been derived from the word “agri” meaning land and “culture” meaning to cultivate.

Q2) **Name the factors influencing agriculture?**

A**. Relief topography:**Relief topography is a type of mapping that uses modeling to show altitude.The cultivation of crops and rearing of animals depends to a large extent on relief of the area. Most of the crops grow in plains but there are certain crops which grow only at high altitudes. Apples, coffee grow at high altitudes while as sheep &yak are reared in mountainous areas.

Soil fertility: Plants grow only in specific type of soil and its fertility which fulfills their requirements.

Climate: The climatic factors play an important role in the growth of plants. Temperature, amount of rainfall and humidity greatly influence agriculture.

Q3) **What is shifting cultivation? What are its disadvantages?**

A. Shifting agriculture is a primitive form of agriculture. Its also knows as slash and burn farming. It includes the clearing of forests by cutting or burning trees. After the land is cleared, crops are grown for 2 to 3 years and than the land is left abandoned as a fertility of the soil decreases. The farmers then move to new area and the process is repeated. Fallow land and land degradation is the outcome of shifting agriculture.

Q4) **What is plantation agriculture?**

A. Plantation agriculture was introduced by the britishers in India in the 19th century. It is a type of commercial farming of a single cash crops grown on large estates. The main aim of a farmer is to earn money. The important features of plantation agriculture are:

1. Farms are large in plantation agriculture.

2. It also needs heavy doses of chemical fertilizers to maintain the fertility of the soil.

3. It requires a good managerial ability with good transport facility.

4. Tea, coffee, rubber plantations are found I n India.

Q5) **Name the fiber crops and name the climatic conditions required for their growth.**

A., Cotton and jute are two important fiber crops of India. Cotton requires high temperature, light rainfall and 210 frost-free days(days when temperature remains above zero degree Celsius continuously) and bright sunshine for its growth. Jute (golden crop) requires high temperatures, heavy rainfall and humid climate.

Q) Give reasons:

i) **In India agriculture is a primary activity:** because it includes the extraction and production of resources directly.

ii) **Different crops are grown in different regions:** because of the factors like latitude, altitude, precipitation patterns and temperature.

Distinguish between primary and territory activities.

Primary activities	Tertiary activities
These include those connected with extraction and production of natural resources.	These provide support to the primary and secondary activities through services.
Agriculture and fishing are good examples of primary activities.	Transport, trade, banking, insurances and advertising are examples if tertiary activities.

Subsistence farming	Intensive farming
It is used to meet the needs of the family or the community the whole year around	It is for mass production of crops that can supply enough for a whole lot of consumers.
Farmers cultivate a small plot of land using simple tools and more labour.	It utilizes large land area with big investments on using labour, fertilizers and pesticides.
Farmers produce crops for their use and not for gaining profit.	The main reason for this type of farming is to gain profit.

From Trade to Territory
Lesson No. 02

Definitions

1. Charter:- A document issued by a sovereign or other authority to create a public or private corporation. City or town, company or an institution.
2. Acquit: To declare free of blame or guilt.
3. Fleshy: Shoury and tasteless.
4. Flaunted: To display boldly.
5. Triumph: A very great success or achievement.
6. Mauling: When an animal attacks someone and injures him with its teeth.
7. Shrieked: A short, loud, high cry.

Textual Questions

Q1: What attracted European trading companies to India?

Ans: The following were the reasons due to which trading companies came to India:

1. Trading with India was highly profitable and fruitful to business men in the Europe because they purchased goods at cheaper rates in India and sold them in Europe at higher prices.
2. The fine qualities of cotton and silk produced in India had a big market in Europe.
3. Indian spices like pepper, cloves, cardamom, cinnamon, were in great demand in Europe.

Q2: What were the areas of conflict between the Bengal nawabs and east India company?

Ans: In the 18^{th} century, after the death of Aurangzeb the Bengal nawabs asserted their power and autonomy. These nawabs refused to grant the company further concessions rather demanded large tributes from the company to trade. These nawabs also denied giving them ant right to mint coins and stop them from extending their fortification.

They misueddastak. Company officials used dastak for their private trade. The company on the other hand was refusing to pay the taxes. Then company officials used to humiliate the nawabs and his officials by writing disrespectful letters to them. The company also declared that the unjust demands of the local officials were ruining the trade, which could flourish only if the duties were removed. The conflicts led to the confrontations and culminated in the Battle of Plassey.

Q3: How did the assumption of Diwani benefit the East India company?
Ans: The Diwani allowed the company to use the vast revenue resources of Bengal. Earlier the company had to buy most of the goods in India in exchange of gold and silver which they imported from Britain. After the assumption of Diwani, the company started to buy things in India with these revenues, as a result of which the outflow of gold and silver from Britain entirely stoped.

Now the Britishers could use these revenues in India to purchase cotton and silver textiles and also to meet the cost of building the company forts and offices at Calcutta.

Q4: Explain the system of "Subsidiary Alliance".
Ans: In order to expand British rule in India the company had devised several plans, one among them was subsidiary Alliance. According to the terms of this alliance, Indian rulers were not allowed to have their independent armed forces. They were to be protected by the company, but had to pay for the "subsidiary forces" that the company was supposed to maintain for the purpose of their protection. If the rulers failed to make the payment, then the part of their territory was taken away as penalty.

Q5: In what way was the administration of the company different from that of the Indian rulers?
Ans: The British territories in India were broadly divided into administrative units called as presidencies. There were three presidencies – Bengal, Madras and Bombay where as under the Indians rulers, the administration was divided into four parts – district, Pargana, Tehsil &Villages.In each presidency a britisher was governor general whereas under the Indian administrative system the supreme head was the king or nawab.

Warren Hastings introduce the system of justice. Each district was to have two courts – civil court and criminal court. The European District collector presided over the civil court and the criminal court was still under a Qazi or a Mufti. Under the Regulation Act of 1773 a new supreme court was established.

Q6: Describe the changes that occurred in the compositions of the company's army.

Ans: The colonial rule in India brought some new ideas of the administration and reform. It also introduced many changes in its army. Initially, the East India Companyalso adopted the same old methods of warfare as that of

Mughals but the change in the warfare technology, infantry requirements became more important than the cavalry requirements. In the early 19th century, the Britishers began to introduce a uniform military culture to European style of training and discipline that regulated their life far more than before. But the Indian soldiers were not given the salary and treated like servants to company.

Topic 2: Land, Soil, Water, Natural vegetation and wildlife **2nd geo. unit**

1.Which are the two main climatic factors responsible for the soil formation?

Ans: Temperature and precipitation are the two factors responsible for the soil formation.

2. Write any two reasons for land degradation today.

Ans: The two reasons for land degradation are deforestation and overuse of chemical fertilizers and pesticides.

3. Why is land considered as an important resource?

Ans: Land is an important natural resource. Primarily land is used for agriculture which is essential for the sustenance of human beings. Besides, land can be used for different purposes like forestry, mining, building houses, roads and setting up industries which improve the standard of living of people and economic prosperity of nation.

4. Write any two steps that the government has taken to conserve plants and animals.

The two steps that have been taken by the government to conserve plants and animals include:

a. National Parks, wildlife sanctuaries and Biosphere reserves have been established to protect our natural vegetation and wildlife.

b. Ban on indiscriminate killing, hunting and poaching has been strictly implemented.

5. Suggest three ways to conserve water.

Ans: The three ways to conserve water are as follows:

i. Rain water harvesting.
ii. Use of sprinkle irrigation which minimizes water loss through seepage and evaporation.
iii. Planting trees reduces the surface runoff and replenishes the underground water.

Subject:-Computer

Class:-8th

Term-I

Topic:-Understanding HTML

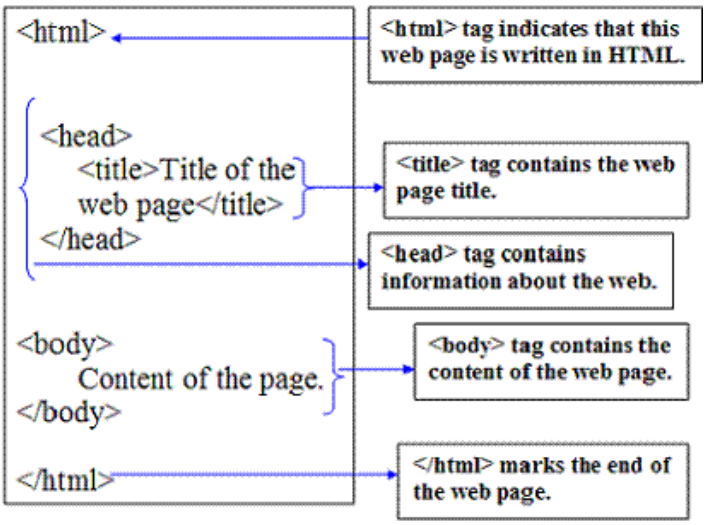
Introduction:-

HTML (Hypertext mark up language) is the most widely used language to design web contents for the internet.

Hypertext refers to the way in which Web pages (HTML documents) are linked together. Thus, the link available on a webpage is called Hypertext.

As its name suggests, HTML is a Markup Language which means you use HTML to simply "mark-up" a text document with tags that tell a Web browser how to structure it to display.

- **Structure Of HTML:-**

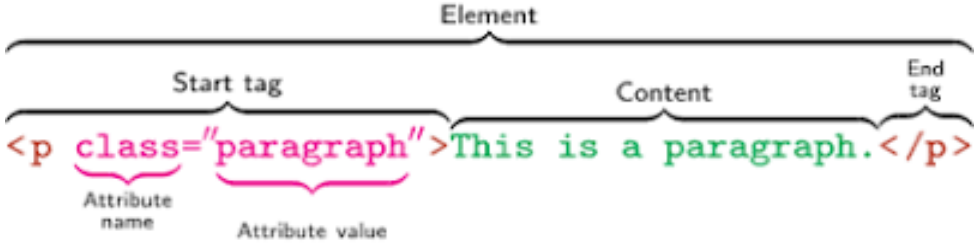


- HTML attributes:-Attributes are the property that provides additional information about HTML elements.

HTML Attributes

Attribute	Description
alt	Specifies an alternative text for an image
disabled	Specifies that an input element should be disabled
href	Specifies the URL (web address) for a link
id	Specifies a unique id for an element
src	Specifies the URL (web address) for an image
style	Specifies an inline CSS style for an element
title	Specifies extra information about an element (displayed as a tool tip)
value	Specifies the value (text content) for an input element.

- **HTML element:-** is defined by a starting tag. If the element contains other content, it ends with a closing tag, where the element name is preceded by a forward slash as shown below with few tags: Start Tag Content End Tag.



- HTML Headings:-It defines six levels of headings. A heading element implies all the font changes, paragraph breaks before and after, and any white space necessary to render the heading. The heading elements are:-

```
<!DOCTYPE html>
<html>
<body>

<h1>Heading 1</h1>
<h2>Heading 2</h2>
<h3>Heading 3</h3>
<h4>Heading 4</h4>
<h5>Heading 5</h5>
<h6>Heading 6</h6>

</body>
</html>
```

- HTMLTAGS:-A tag is a piece of code, which acts as a label that a web browser interprets. There are two types of tags:-
  1) Container tag:-Includes both ON and OFF tags.For example:- <HTML>.....</HTML> <TITLE>....</TITLE>
  2) Empty tag:-contains only ON tag. For example:-
 <HR>

- HTML formatting:- If you use a word processor, you must be familiar with the ability to make text bold, italicized, or underlined; these are just three options available to indicate how text can appear in HTML.
    - **Bold text** Anything that appears within<B> ...</B> element, is displayed in bold.
    - Underline text Anything that appears within <U> ... </U> element, is displayed with underline a
    - *Italic text* Anything that appears within <i> .. <*li*>. element is displayed in italicized.

Answer the Following Questions:-

Qno1:-what is HTML?

Ans:- HTML (Hypertext mark up language) is the most widely used language to design web contents for the internet.

Qno2:-What do you understand by tags? How many types of tags are there?

Ans:- A tag is a piece of code, which acts as a label that a web browser interprets. There are two types of tags:-

1) Container tags.
2) Empty tags.

Qno3:-Differentiate between Container tag and Empty tag.

Ans:-

Container tag	Empty tag:-
Container tag Includes both ON and OFF tags called container	Empty tag contains only ON tag. They do not have OFF tags. These

elements. A tag is opened using opening angle brackets ‘<>’ and closed using closing brackets’</>’.	elements do not enclose any data. Instead they function their own.

Qno4:-What do you understand by attributes in HTML?

Ans:-Attributes are the property that provides additional information about HTML elements.

Qno5:-Explain paragraph tag and its attributes.

Ans:-The paragraph tag <P> offers a way to structure the text into different paragraphs. Each paragraph of text should be given between <P>.....</P> tags. A paragraph tag can be aligned using the attribute name “Align”.

Various attributes of paragraph element are as follows:-

Syntax:-

<P>+ starts a new paragraph.

<P>Align=”center”>=Aligns the text to the center.

<P>Align=”Right”>=Aligns the text to the right.

<P>Align=”Left”>=Aligns the text to the Left.

<P>Align=”justify”>=Aligns the text evenly between both left and right margins.

Qno6:-What is the significance of BG colour attribute of <BODY> tag?

Ans:-The background colour attribute is used to change the background colour of the webpage.

Syntax:-<BODYBGCOLOR=”RED”>.

Qno7:-What is the significance of <BR> tag?

Ans:-Whenever we use the <BR> tag everything written after this tag breaks the line and displays the text from the next line, without giving any space between two lines. It should be given at the end of the line after which a new line is required.

Syntax :-

Qno8:-Which tags are used to apply the bold underline and italic properties of the text?

Ans:- For bold text we use <B>.... </B> tag.

For underline text we use <U>.... </U> tag.

For Italic text we use .... tag.

Qno9:-Which attribute of <BODY> tags are used to set margins in a web page?

Ans:-The top margin attribute is used to set margins in a webpage.

Syntax: <BODYTOPMARGIN=”VALUE”>

</BODY>

Exercise 6.1

Question 1:

What will be the unit digit of the squares of the following numbers? (i) 81 (ii)
272
(iii) 799 (iv) 3853 (v)
1234 (vi) 26387
(vii) 52698 (viii) 99880 (ix)
12796 (x) 55555 Answer:

We know that if a number has its unit's place digit as *a*, then its square will end with the unit digit of the multiplication $a \times a$.

(i) 81

Since the given number has its unit's place digit as 1, its square will end with the unit digit of the multiplication (1 ×1 = 1) i.e.,1.

(ii) 272

Since the given number has its unit's place digit as 2, its square will end with the unit digit of the multiplication (2 × 2 = 4) i.e.,4.

(iii) 799

Since the given number has its unit's place digit as 9, its square will end with the unit digit of the multiplication (9 × 9 = 81) i.e.,1.

(iv) 3853

Since the given number has its unit's place digit as 3, its square will end with the unit digit of the multiplication (3 × 3 = 9) i.e.,9.

(v) 1234

Since the given number has its unit's place digit as 4, its square will end with the unit digit of the multiplication (4 × 4 = 16) i.e.,6.

(vi) 26387

Since the given number has its unit's place digit as 7, its square will end with the unit digit of the multiplication (7 × 7 = 49) i.e.,9.

(vii) 52698

Since the given number has its unit's place digit as 8, its square will end with the unit digit of the multiplication (8 × 8 = 64) i.e.,4.

(viii) 99880

Since the given number has its unit's place digit as 0, its square will have two zeroes at the end. Therefore, the unit digit of the square of the given number is 0.

(xi) 12796

Since the given number has its unit's place digit as 6, its square will end with the unit digit of the multiplication (6 × 6 = 36) i.e.,6.

(x) 55555

Since the given number has its unit's place digit as 5, its square will end with the unit digit of the multiplication (5 × 5 = 25) i.e.,5.

Question 2:

The following numbers are obviously not perfect squares. Give reason. (i) 1057

(ii) 23453

(iii) 7928 (iv) 222222

(v) 64000 (vi) 89722

(vii) 222000 (viii) 505050

Answer:

The square of numbers may end with any one of the digits 0, 1, 5, 6, or 9. Also, a perfect square has even number of zeroes at the end of it.

(i) 1057 has its unit place digit as 7. Therefore, it cannot be a perfectsquare.

(ii) 23453 has its unit place digit as 3. Therefore, it cannot be a perfectsquare.

(iii) 7928 has its unit place digit as 8. Therefore, it cannot be a perfectsquare.

(iv) 222222 has its unit place digit as 2. Therefore, it cannot be a perfectsquare.

(v) 64000 has three zeros at the end of it. However, since a perfect square cannot end with odd number of zeroes, it is not a perfectsquare.

(vi) 89722 has its unit place digit as 2. Therefore, it cannot be a perfectsquare.

(vii) 222000 has three zeroes at the end of it. However, since a perfect square cannot end with odd number of zeroes, it is not a perfectsquare.

(viii) 505050 has one zero at the end of it. However, since a perfect square cannot end with odd number of zeroes, it is not a perfectsquare.

Question 3:

Find the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube.

(i) 243

(ii) 256

(iii) 72

(iv) 675

(v) 100

Answer:

(i) 243 = 3 × 3 × 3× 3 × 3

Here, two 3s are left which are not in a triplet. To make 243 a cube, one more 3 is required.

In that case, 243 × 3 = 3 × 3 × 3× 3 × 3 × 3= 729 is a perfect cube.

Hence, the smallest natural number by which 243 should be multiplied to make it a perfect cube is 3.

(ii) 256 = 2 × 2 × 2× 2 × 2 × 2× 2 × 2

Here, two 2s are left which are not in a triplet. To make 256 a cube, one more 2 is required.

Then, we obtain

256 × 2 = 2 × 2 × 2× 2 × 2 × 2× 2 × 2 × 2= 512 is a perfect cube.

Hence, the smallest natural number by which 256 should be multiplied to make it a perfect cube is 2.

(iii) 72 = 2 × 2 × 2× 3 × 3

Here, two 3s are left which are not in a triplet. To make 72 a cube, one more 3 is required.

Then, we obtain

72 × 3 = 2 × 2 × 2× 3 × 3 × 3= 216 is a perfect cube.

Hence, the smallest natural number by which 72 should be multiplied to make it a perfect cube is 3.

(iv) 675 = $\underline{3 \times 3 \times 3} \times 5 \times 5$

Here, two 5s are left which are not in a triplet. To make 675 a cube, one more 5 is required.

Then, we obtain

675 × 5 = $\underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$ = 3375 is a perfect cube.

Hence, the smallest natural number by which 675 should be multiplied to make it a perfect cube is 5.

(v) 100 = 2 × 2 × 5 × 5

Here, two 2s and two 5s are left which are not in a triplet. To make 100 a cube, we require one more 2 and one more 5.

Then, we obtain

100 × 2 × 5 = $\underline{2 \times 2 \times 2} \times \underline{5 \times 5 \times 5}$ = 1000 is a perfect cube

Hence, the smallest natural number by which 100 should be multiplied to make it a perfect cube is 2 × 5 = 10.

Question 4:

Observe the following pattern and find the missing digits. 11^2 =

121

101^2 = 10201

1001^2 = 1002001

100001^2 = 1…2…1

10000001^2 = …

Answer:

In the given pattern, it can be observed that the squares of the given numbers have the same number of zeroes before and after the digit 2 as it was in the original number. Therefore,

100001^2 = 10000200001

10000001^2 = 100000020000001

Question 5:

Observe the following pattern and supply the missing number. 11^2=

121

101^2= 10201

10101^2= 102030201

1010101^2= …

$…^2$= 10203040504030201

Answer:

By following the given pattern, we obtain

1010101^2= 1020304030201

101010101^2= 10203040504030201

Question 6:

Using the given pattern, find the missing numbers. 1^2+ 2^2+

2^2=3^2

2^2+ 3^2+ 6^2=7^2

3^2+ 4^2+ 12^2= 13^2

4^2+ 5^2+ _ ^{2}= 21^2

5^2+ _ ^{2}+ 30^2= 31^2

6^2+ 7^2+ _^{2}=_____^{2}

Answer:

From the given pattern, it can be observed that,

(i) The third number is the product of the first twonumbers.

(ii) The fourth number can be obtained by adding 1 to the third number. Thus, the missing numbers in the pattern will be asfollows.

4^2+5^2+ $\underline{20^2}$ =21^2

5^2+ $\underline{6^2}$ + 30^2=31^2

6^2+7^2+ $\underline{42^2}$ = $\underline{43^2}$

Question 7:

Without adding find the sum

(i) 1 + 3 + 5 + 7 + 9

(ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19

(iii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23

Answer:

We know that the sum of first n odd natural numbers is n^2.

(i) Here, we have to find the sum of first five odd naturalnumbers.

Therefore, $1 + 3 + 5 + 7 + 9 = (5)^2 = 25$

(ii) Here, we have to find the sum of first ten odd natural numbers. Therefore, 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 = $(10)^2$=100

(iii) Here, we have to find the sum of first twelve odd naturalnumbers.

Therefore, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 = (12)^2 = 144$

Question 8:

(i) Express 49 as the sum of 7 oddnumbers.

(ii) Express 121 as the sum of 11odd numbers.

Answer:

We know that the sum of first n odd natural numbers is n^2. (i) 49 = $(7)^2$

Therefore, 49 is the sum of first 7 odd natural numbers. 49 = 1 + 3 + 5 + 7 + 9 + 11 + 13

(ii) 121 = $(11)^2$

Therefore, 121 is the sum of first 11 odd natural numbers. 121 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21

Question 9:

How many numbers lie between squares of the following numbers?

(i) 12 and 13 (ii) 25 and 26 (iii) 99 and 100 Answer:

We know that there will be $2n$ numbers in between the squares of the numbers n and $(n + 1)$.

(i) Between $12^2$and 13^2, there will be 2 × 12 = 24numbers

(ii) Between $25^2$and 26^2, there will be 2 × 25 = 50numbers

(iii) Between $99^2$and 100^2, there will be 2 × 99 = 198numbers

Exercise 6.2

Question 1:

Find the square of the following numbers (i)

32 (ii) 35

(iii) 86 (iv) 93 (v)

71 (vi) 46

Answer:

(i) $32^2 = (30 + 2)^2$

$= 30 (30 + 2) + 2 (30 + 2)$

$= 30^2 + 30 \times 2 + 2 \times 30 + 2^2$

$= 900 + 60 + 60 + 4$

$= 1024$

(ii) The number 35 has 5 in its unit's place. Therefore, $35^2 = (3)$

(3 + 1) hundreds +25

$= (3 \times 4)$ hundreds + 25

$= 1200 + 25 = 1225$

(iii) $86^2 = (80 + 6)^2$

$= 80 (80 + 6) + 6 (80 + 6)$

$= 80^2 + 80 \times 6 + 6 \times 80 + 6^2$

$= 6400 + 480 + 480 + 36$

$= 7396$

(iv) $93^2 = (90 + 3)^2$

$= 90 (90 + 3) + 3 (90 + 3)$

$= 90^2 + 90 \times 3 + 3 \times 90 + 3^2$

$= 8100 + 270 + 270 + 9$

$= 8649$

(v) $71^2 = (70 + 1)^2$

$= 70 (70 + 1) + 1 (70 + 1)$

$= 70^2 + 70 \times 1 + 1 \times 70 + 1^2$

$= 4900 + 70 + 70 + 1$

= 5041

(vi) $46^2 = (40 + 6)^2$

= 40 (40 + 6) + 6 (40 + 6)

= $40^2 + 40 \times 6 + 6 \times 40 + 6^2$

= 1600 + 240 + 240 + 36

= 2116

Question 2:

Write a Pythagorean triplet whose one member is

(i) 6 (ii) 14

(iii) 16 (iv) 18

Answer:

For any natural number $m > 1$, $2m$, $m^2 - 1$, $m^2 + 1$ forms a Pythagorean triplet.

(i) If we take $m^2 + 1 = 6$, then $m^2 = 5$ The value of m will not be an integer. If we take $m^2 - 1 = 6$, then $m^2 = 7$ Again the value of m is not aninteger.

Let $2m = 6$

$m = 3$

Therefore, the Pythagorean triplets are 2×3, $3^2 - 1$, $3^2 + 1$ or 6, 8, and 10.

(ii) If we take $m^2 + 1 = 14$, then $m^2 = 13$ The value of m will not be aninteger.

If we take $m^2 - 1 = 14$, then $m^2 = 15$ Again the value of m is not an integer.

Let $2m = 14$

$m = 7$

Thus, $m^2 - 1 = 49 - 1 = 48$ and $m^2 + 1 = 49 + 1 = 50$

Therefore, the required triplet is 14, 48, and 50.

(iii) If we take $m^2 + 1 = 16$, then $m^2 = 15$ The value of m will not be aninteger.

If we take $m^2 - 1 = 16$, then $m^2 = 17$

Again the value of m is not an integer.

Let $2m = 16$

$m = 8$

Thus, $m^2 - 1 = 64 - 1 = 63$ and $m^2 + 1 = 64 + 1 = 65$

Therefore, the Pythagorean triplet is 16, 63, and 65.

(iv) If we take $m^2 + 1 = 18$,

$m^2 = 17$

The value of m will not be an integer. If we take $m^2 - 1 = 18$, then $m^2 = 19$ Again the value of m is not an integer.

Let $2m = 18$

$m = 9$

Thus, $m^2 - 1 = 81 - 1 = 80$ and $m^2 + 1 = 81 + 1 = 82$

Therefore, the Pythagorean triplet is 18, 80, and 82.

Exercise 6.3

Question 1:

What could be the possible 'one's' digits of the square root of each of the following numbers?

(i) 9801 (ii) 99856

(iii) 998001 (iv) 657666025

Answer:

(i) If the number ends with 1, then the one's digit of the square root of that number may be 1 or 9. Therefore, one's digit of the square root of 9801 is either 1 or9.

(ii) If the number ends with 6, then the one's digit of the square root of that number may be 4 or 6. Therefore, one's digit of the square root of 99856 is either 4 or6.

(iii) If the number ends with 1, then the one's digit of the square root of that number may be 1 or 9. Therefore, one's digit of the square root of 998001 is either 1 or9.

(iv) If the number ends with 5, then the one's digit of the square root of that number will be 5. Therefore, the one's digit of the square root of 657666025 is5.

Question 2:

Without doing any calculation, find the numbers which are surely not perfect squares.

(i) 153 (ii) 257

(iii) 408 (iv) 441

Answer:

The perfect squares of a number can end with any of the digits 0, 1, 4, 5, 6, or 9 at unit's place. Also, a perfect square will end with even number of zeroes, if any.

(i) Since the number 153 has its unit's place digit as 3, it is not a perfectsquare.

(ii) Since the number 257 has its unit's place digit as 7, it is not a perfectsquare.

(iii) Since the number 408 has its unit's place digit as 8, it is not a perfectsquare.

(iv) Since the number 441 has its unit's place digit as 1, it is a perfectsquare.

Question 3:

Find the square roots of 100 and 169 by the method of repeated subtraction.

Answer:

We know that the sum of the first n odd natural numbers is n^2.

Consider $\sqrt{100}$.

(i) 100 − 1 = 99 (ii) 99 − 3 = 96 (iii) 96 − 5 = 91

(iv) 91 − 7 = 84 (v) 84 − 9 = 75 (vi) 75 − 11= 64

(vii) 64 − 13 = 51 (viii) 51 − 15 = 36 (ix) 36 − 17 = 19

(x) 19 − 19 = 0

We have subtracted successive odd numbers starting from 1 to 100, and obtained 0 at 10thstep.

Therefore,

The square root $\sqrt{100} = 10$ can be obtained by the method of repeated subtraction as follows.

(i) 169 − 1 = 168 (ii) 168 − 3 = 165 (iii) 165 − 5 = 160

(iv) 160 − 7 = 153 (v) 153 − 9 = 144 (vi) 144 − 11 = 133

(vii) 133 − 13 = 120 (viii) 120 − 15 = 105 (ix) 105 − 17 = 88

(x) 88 − 19 = 69 (xi) 69 − 21 = 48 (xii) 48 − 23 = 25

(xiii)25 − 25 = 0

We have subtracted successive odd numbers starting from 1 to 169, and obtained 0 at 13thstep.

Therefore,

Question 4: $\sqrt{169} = 13$

Find the square roots of the following numbers by the Prime Factorisation Method. (i) 729 (ii) 400

(iii) 1764 (iv) 4096 (v) 7744 (vi) 9604

(vii) 5929 (viii) 9216 (ix) 529 (x) 8100 Answer:

(i) 729 can be factorised asfollows.

3	729
3	243
3	81
3	27
3	9
3	3
	1

729 = 3 × 3× 3 × 3× 3 × 3

∴ $\sqrt{729} = 3 \times 3 \times 3$ =27

(ii) 400 can be factorised asfollows.

2	400
2	200
2	100
2	50
5	25
5	5
	1

400 = 2 × 2× 2 × 2× 5 × 5

∴ $\sqrt{400} = 2 \times 2 \times 5$ =20

(iii) 1764 can be factorised asfollows.

2	1764
2	882
3	441
3	147
7	49
7	7
	1

1764 = 2 × 2 × 3 × 3 × 7 × 7

∴ $\sqrt{1764} = 2 \times 3 \times 7$ =42

(iv) 4096 can be factorised asfollows.

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32

2	16
2	8
2	4
2	2
	1

4096 = 2 × 2× 2 × 2× 2 × 2× 2 × 2× 2 × 2× 2 × 2

∴ $\sqrt{4096} = 2\times2\times2\times2\times2\times2$ =64

(v) 7744 can be factorised asfollows.

2	7744
2	3872
2	1936
2	968
2	484
2	242
11	121
11	11
	1

7744 = 2 × 2× 2 × 2× 2 × 2× 11 × 11

∴ $\sqrt{7744} = 2\times2\times2\times11$ =88

(vi) 9604 can be factorised asfollows.

2	9604
2	4802
7	2401
7	343
7	49
7	7
	1

9604 = 2 × 2× 7 × 7× 7 × 7

∴ $\sqrt{9604} = 2 \times 7 \times 7$ =98

(vii) 5929 can be factorised asfollows.

7	5929
7	847
11	121
11	11
	1

5929 = 7 × 7× 11 × 11

∴ $\sqrt{5929} = 7 \times 11$ =77

(viii) 9216 can be factorised asfollows.

2	9216

2	4608
2	2304
2	1152
2	576
2	288
2	144
2	72
2	36
2	18
3	9
3	3
	1

9216 = 2 × 2× 2 × 2× 2 × 2× 2 × 2× 2 × 2× 3× 3

∴ $\sqrt{9216} = 2\times2\times2\times2\times2\times3$ =96

(ix) 529 can be factorised asfollows.

23	529
23	23
	1

529 = 23 × 23

$\sqrt{529} = 23$

(x) 8100 can be factorised asfollows.

2	8100
2	4050
3	2025
3	675
3	225
3	75
5	25
5	5
	1

8100 = 2 × 2× 3 × 3× 3 × 3× 5 × 5

∴ $\sqrt{8100} = 2 \times 3 \times 3 \times 5$ =90

Question 5:

For each of the following numbers, find the smallest whole number by which it should be multiplied so as to get a perfect square number. Also find the square root of the square number soobtained.

(i) 252 (ii) 180

(iii) 1008 (iv) 2028 (v)

1458 (vi) 768

Answer:

(i) 252 can be factorised asfollows.

2	252
2	126
3	63
3	21
7	7
	1

252 = 2 × 2× 3 × 3× 7

Here, prime factor 7 does not have its pair.

If 7 gets a pair, then the number will become a perfect square. Therefore, 252 has to be multiplied with 7 to obtain a perfect square.

252 × 7 = 2 × 2× 3 × 3× 7 × 7

Therefore, 252 × 7 = 1764 is a perfect square.

$\therefore \sqrt{1764} = 2 \times 3 \times 7 = 42$

(ii) 180 can be factorised asfollows.

2	180
2	90
3	45
3	15
5	5

	1

180 = 2 × 2× 3 × 3× 5

Here, prime factor 5 does not have its pair. If 5 gets a pair, then the number will become a perfect square. Therefore, 180 has to be multiplied with 5 to obtain a perfect square.

180 × 5 = 900 = 2 × 2× 3 × 3× 5 × 5

Therefore, 180 × 5 = 900 is a perfect square.

∴ $\sqrt{900} = 2 \times 3 \times 5$ =30

(iii) 1008 can be factorised asfollows.

2	1008
2	504
2	252
2	126
3	63
3	21
7	7
	1

1008 = 2 × 2× 2 × 2× 3 × 3× 7

Here, prime factor 7 does not have its pair. If 7 gets a pair, then the number will become a perfect square. Therefore, 1008 can be multiplied with 7 to obtain a perfectsquare.

1008 × 7 = 7056 = 2 × 2×2 × 2× 3 × 3× 7 × 7

Therefore, 1008 × 7 = 7056 is a perfect square.

∴ $\sqrt{7056} = 2 \times 2 \times 3 \times 7$ =84

(iv) 2028 can be factorised asfollows.

2	2028
2	1014
3	507
13	169
13	13
	1

2028 = 2 × 2× 3 × 13 × 13

Here, prime factor 3 does not have its pair. If 3 gets a pair, then the number will become a perfect square. Therefore, 2028 has to be multiplied with 3 to obtain a perfect square.

Therefore, 2028 × 3 = 6084 is a perfect square. 2028 ×

3 = 6084 = 2 × 2× 3 × 3× 13 × 13

∴ $\sqrt{6084} = 2 \times 3 \times 13$ =78

(v) 1458 can be factorised asfollows.

2	1458
3	729
3	243
3	81
3	27

3	9
3	3
	1

1458 = 2 × 3 × 3× 3 × 3× 3 × 3

Here, prime factor 2 does not have its pair. If 2 gets a pair, then the number will become a perfect square. Therefore, 1458 has to be multiplied with 2 to obtain a perfect square.

Therefore, 1458 × 2 = 2916 is a perfect square. 1458 × 2 =

2916 = 2 × 2× 3 × 3× 3 × 3× 3 × 3

∴ $\sqrt{2916} = 2 \times 3 \times 3 \times 3$ =54

(vi) 768 can be factorised asfollows.

2	768
2	384
2	192
2	96
2	48
2	24
2	12
2	6
3	3

	1

768 = 2 × 2× 2 × 2× 2 × 2× 2 × 2× 3

Here, prime factor 3 does not have its pair. If 3 gets a pair, then the number will become a perfect square. Therefore, 768 has to be multiplied with 3 to obtain a perfect square.

Therefore, 768 × 3 = 2304 is a perfect square.

768 × 3 = 2304 = 2 × 2× 2 × 2× 2 × 2× 2 × 2× 3 × 3

∴ $\sqrt{2304} = 2\times2\times2\times2\times3$ =48

Question 6:

For each of the following numbers, find the smallest whole number by which it should be divided so as to get a perfect square number. Also find the square root of the square number soobtained.

(i) 252 (ii) 2925

(iii) 396 (iv) 2645 (v)

2800 (vi) 1620

Answer:

(i) 252 can be factorised asfollows.

2	252
2	126
3	63
3	21
7	7
	1

$252 = 2\times2\times3\times3\times7$

Here, prime factor 7 does not have its pair.

If we divide this number by 7, then the number will become a perfect square. Therefore, 252 has to be divided by 7 to obtain a perfect square.

252 ÷7 = 36 is a perfect square.

$36 = \underline{2\times 2}\times\underline{3\times 3}$

$\therefore \sqrt{36} = 2\times 3 = 6$

(ii) 2925 can be factorised as follows.

3	2925
3	975
5	325
5	65
13	13
	1

$2925 = \underline{3\times 3}\times\underline{5\times 5}\times 13$

Here, prime factor 13 does not have its pair.

If we divide this number by 13, then the number will become a perfect square. Therefore, 2925 has to be divided by 13 to obtain a perfect square.

2925 ÷13 = 225 is a perfect square.

$225 = \underline{3\times 3}\times\underline{5\times 5}$

$\therefore \sqrt{225} = 3\times 5 = 15$

(iii) 396 can be factorised asfollows.

2	396
2	198
3	99

3	33
11	11
	1

$396 = \underline{2\times 2}\times \underline{3\times 3}\times 11$

Here, prime factor 11 does not have its pair.

If we divide this number by 11, then the number will become a perfect square. Therefore, 396 has to be divided by 11 to obtain a perfect square.

396 ÷11 = 36 is a perfect square.

$36 = \underline{2\times 2}\times \underline{3\times 3}$

$\therefore \sqrt{36} = 2\times 3 = 6$

(iv) 2645 can be factorised asfollows.

5	2645
23	529
23	23
	1

$2645 = 5\times \underline{23\times 23}$

Here, prime factor 5 does not have its pair.

If we divide this number by 5, then the number will become a perfect square. Therefore,

2645 has to be divided by 5 to obtain a perfect square.

2645 ÷5 = 529 is a perfect square.

$529 = \underline{23\times 23}$

$\therefore \sqrt{529} = 23$

(v) 2800 can be factorised as follows.

2	2800
2	1400
2	700
2	350
5	175
5	35
7	7
	1

$2800 = \underline{2\times 2}\times\underline{2\times 2}\times\underline{5\times 5}\times 7$

Here, prime factor 7 does not have its pair.

If we divide this number by 7, then the number will become a perfect square. Therefore,

2800 has to be divided by 7 to obtain a perfect square.

2800 ÷7 = 400 is a perfect square.

$400 = \underline{2\times 2}\times\underline{2\times 2}\times\underline{5\times 5}$

$\therefore \quad \sqrt{400} = 2\times 2\times 5 = 20$

(vi) 1620 can be factorised asfollows.

2	1620
2	810
3	405
3	135

3	45
3	15
5	5
	1

$1620 = \underline{2\times 2}\times\underline{3\times 3}\times\underline{3\times 3}\times 5$

Here, prime factor 5 does not have its pair.

If we divide this number by 5, then the number will become a perfect square. Therefore,

1620 has to be divided by 5 to obtain a perfect square.

1620 ÷5 = 324 is a perfect square.

$324 = \underline{2\times 2}\times\underline{3\times 3}\times\underline{3\times 3}$

$\therefore \sqrt{324} = 2\times 3\times 3 = 18$

Question 7:

The students of Class VIII of a school donated Rs 2401 in all, for Prime Minister's National Relief Fund. Each student donated as many rupees as the number of students in the class. Find the number of students in the class.

Answer:

It is given that each student donated as many rupees as the number of students of the class. Number of students in the class will be the square root of the amount donated by the students of the class.

The total amount of donation is Rs 2401.

Number of students in the class = $\sqrt{2401}$

$2401 = \underline{7\times 7}\times\underline{7\times 7}$

$\therefore \sqrt{2401} = 7\times 7 = 49$

Hence, the number of students in the class is 49.

Question 8:

2025 plants are to be planted in a garden in such a way that each row contains as many plants as the number of rows. Find the number of rows and the number of plants in each row.

Answer:

It is given that in the garden, each row contains as many plants as the number of rows.

Hence,

Number of rows = Number of plants in each row

Total number of plants = Number of rows × Number of plants in each row Number of rows × Number of plants in each row = 2025

$(\text{Number of rows})^2 = 2025$

$$\text{Number of rows} = \sqrt{2025}$$

$$2025 = \underline{5\times 5}\times\underline{3\times 3}\times\underline{3\times 3}$$

$$\therefore \quad \sqrt{2025} = 5\times 3\times 3 = 45$$

Thus, the number of rows and the number of plants in each row is 45.

Question 9:

Find the smallest square number that is divisible by each of the numbers 4, 9, and 10.

Answer:

The number that will be perfectly divisible by each one of 4, 9, and 10 is their LCM. The LCM of these numbers is as follows.

2	4, 9, 10
2	2, 9, 5
3	1, 9, 5
3	1, 3, 5

5	1, 1, 5
	1, 1, 1

LCM of 4, 9, 10 = 2 × 2× 3 × 3× 5 =180

Here, prime factor 5 does not have its pair. Therefore, 180 is not a perfect square. If we multiply 180 with 5, then the number will become a perfect square. Therefore, 180 should be multiplied with 5 to obtain a perfect square.

Hence, the required square number is 180 × 5 = 900

Question 10:

Find the smallest square number that is divisible by each of the numbers 8, 15, and 20.

Answer:

The number that is perfectly divisible by each of the numbers 8, 15, and 20 is their LCM.

2	8, 15, 20
2	4, 15, 10
2	2, 15, 5
3	1, 15, 5
5	1, 5, 5
	1, 1, 1

LCM of 8, 15, and 20 = 2 × 2× 2 × 3 × 5 =120

Here, prime factors 2, 3, and 5 do not have their respective pairs. Therefore, 120 is not a perfect square.

Therefore, 120 should be multiplied by 2 × 3 × 5, i.e. 30, to obtain a perfect square. Hence, the required square number is 120 × 2 × 3 × 5 = 3600

Exercise 6.4

Question 1:

Find the square root of each of the following numbers by division method. (i) 2304 (ii) 4489

(iii) 3481 (iv) 529 (v) 3249 (vi) 1369

(vii) 5776 (viii) 7921

(ix) 576 (x)1024

(xi) 3136 (xii) 900

Answer:

(i) The square root of 2304 can be calculated asfollows.

	48
4	$\overline{23}\,\overline{04}$ -16
88	704 704
	0

$\therefore \sqrt{2304} = 48$

(ii) The square root of 4489 can be calculated asfollows.

	67
6	$\overline{44}\,\overline{89}$ -36
127	889 889

	0

$\therefore \sqrt{4489} = 67$

(iii) The square root of 3481 can be calculated asfollows.

	59
5	$\overline{34}\,\overline{81}$ -25
109	981 981
	0

Therefore, $\sqrt{3481} = 59$

(iv) The square root of 529 can be calculated asfollows.

	23
2	$\overline{5}\,\overline{29}$ -4
43	129 129
	0

$\therefore \sqrt{529} = 23$

(v) The square root of 3249 can be calculated asfollows.

	57

5	$\overline{32}\,\overline{49}$ -25
107	749 749
	0

$\therefore \quad \sqrt{3249} = 57$

(vi) The square root of 1369 can be calculated asfollows.

	37
3	$\overline{13}\,\overline{69}$ -9
67	469 469
	0

$\therefore \quad \sqrt{1369} = 37$

(vii) The square root of 5776 can be calculated asfollows.

	76
7	$\overline{57}\,\overline{76}$ -49
146	876 876

	0

$\therefore \sqrt{5776} = 76$

(viii) The square root of 7921 can be calculated asfollows.

	89
8	$\overline{79}\,\overline{21}$ -64
169	1521 1521
	0

$\therefore \sqrt{7921} = 89$

(ix) The square root of 576 can be calculated asfollows.

	24
2	$\overline{5}\,\overline{76}$ -4
44	176 176
	0

$\therefore \sqrt{576} = 24$

(x) The square root of 1024 can be calculated asfollows.

	32

3	$\overline{10}\,\overline{24}$ -9
62	124 124
	0

$\therefore \sqrt{1024} = 32$

(xi) The square root of 3136 can be calculated asfollows.

	56
5	$\overline{31}\,\overline{36}$ -25
106	636 636
	0

$\therefore \sqrt{3136} = 56$

(xii) The square root of 900 can be calculated asfollows.

	30
3	$\overline{9}\,\overline{00}$ -9
60	00 00
	0

$\therefore \quad \sqrt{900} = 30$

Question 2:

Find the number of digits in the square root of each of the following numbers (without anycalculation).

(i) 64 (ii) 144

(iii) 4489 (iv) 27225 (v)

390625

Answer:

(i) By placing bars, we obtain

$64 = \overline{64}$

Since there is only one bar, the square root of 64 will have only one digit in it.

(ii) By placing bars, weobtain

$144 = \overline{1}\,\overline{44}$

Since there are two bars, the square root of 144 will have 2 digits in it.

(iii) By placing bars, weobtain

$4489 = \overline{44}\,\overline{89}$

Since there are two bars, the square root of 4489 will have 2 digits in it.

(iv) By placing bars, weobtain

$27225 = \overline{2}\,\overline{72}\,\overline{25}$

Since there are three bars, the square root of 27225 will have three digits in it.

(v) By placing the bars, weobtain

$390625 = \overline{39}\,\overline{06}\,\overline{25}$

Since there are three bars, the square root of 390625 will have 3 digits in it.

Question 3:

Find the square root of the following decimal numbers. (i) 2.56

(ii) 7.29

(iii) 51.84 (iv) 42.25

(v) 31.36

Answer:

(i) The square root of 2.56 can be calculated asfollows.

	1. 6
1	$\overline{2.56}$ -1
26	156 156
	0

$\therefore \sqrt{2.56} = 1.6$

(ii) The square root of 7.29 can be calculated asfollows.

	2. 7
2	$\overline{7.29}$ -4
47	329 329
	0

$\therefore \sqrt{7.29} = 2.7$

(iii) The square root of 51.84 can be calculated asfollows.

	7.2
7	$\overline{51.84}$ -49

142	284 284
	0

$\therefore \sqrt{51.84} = 7.2$

(iv) The square root of 42.25 can be calculated asfollows.

	6.5
6	$\overline{42.25}$ -36
125	625 625
	0

$\therefore \sqrt{42.25} = 6.5$

(v) The square root of 31.36 can be calculated asfollows.

	5.6
5	$\overline{31.36}$ -25
106	636 636
	0

$\therefore \sqrt{31.36} = 5.6$

Question 4:

Find the least number which must be subtracted from each of the following numbers so as to get a perfect square. Also find the square root of the perfect square so obtained.

(i) 402 (ii) 1989

(iii) 3250 (iv) 825 (v)

4000

Answer:

(i) The square root of 402 can be calculated by long division method asfollows.

	20
2	$\overline{4}\,\overline{02}$ -4
40	02 00
	2

The remainder is 2. It represents that the square of 20 is less than 402 by 2. Therefore, a perfect square will be obtained by subtracting 2 from the given number 402.

Therefore, required perfect square = 402 − 2 = 400

And, $\sqrt{400} = 20$

(ii) The square root of 1989 can be calculated by long division method asfollows.

	44
4	$\overline{19}\,\overline{89}$ -16

84	389 336
	53

The remainder is 53. It represents that the square of 44 is less than 1989 by 53. Therefore, a perfect square will be obtained by subtracting 53 from the given number1989.

Therefore, required perfect square = 1989 − 53 = 1936

And, $\sqrt{1936} = 44$

(iii) The square root of 3250 can be calculated by long division method asfollows.

	57
5	$\overline{32}\,\overline{50}$ -25
107	750 749
	1

The remainder is 1. It represents that the square of 57 is less than 3250 by 1. Therefore, a perfect square can be obtained by subtracting 1 from the given number 3250.

Therefore, required perfect square = 3250 − 1 = 3249

And, $\sqrt{3249} = 57$

(iv) The square root of 825 can be calculated by long division method asfollows.

	28

2	$\overline{8}\,\overline{25}$ -4
48	425 384
	41

The remainder is 41. It represents that the square of 28 is less than 825 by 41. Therefore, a perfect square can be calculated by subtracting 41 from the given number 825.

Therefore, required perfect square = 825 − 41 = 784

And, $\sqrt{784} = 28$

(v) The square root of 4000 can be calculated by long division method asfollows.

	63
6	$\overline{40}\,\overline{00}$ -36
123	400 369
	31

The remainder is 31. It represents that the square of 63 is less than 4000 by 31. Therefore, a perfect square can be obtained by subtracting 31 from the given number4000.

Therefore, required perfect square = 4000 − 31 = 3969 And,

$\sqrt{3969} = 63$

Question 5:

Find the least number which must be added to each of the following numbers so as to get a perfect square. Also find the square root of the perfect square so obtained. (i) 525 (ii)1750 (iii) 252 (iv) 1825 (v)

6412

Answer:

(i) The square root of 525 can be calculated by long division method asfollows.

	22
2	$\overline{5}\,\overline{25}$ -4
42	125 84
	41

The remainder is 41.

It represents that the square of 22 is less than 525. Next

number is 23 and $23^2 = 529$

Hence, number to be added to 525 = $23^2 - 525 = 529 - 525 = 4$

The required perfect square is 529 and $\sqrt{529} = 23$

(ii) The square root of 1750 can be calculated by long division method asfollows.

	41
4	$\overline{17}\,\overline{50}$ -16
81	150

	81
	69

The remainder is 69.

It represents that the square of 41 is less than 1750. The

next number is 42 and 42^2= 1764

Hence, number to be added to 1750 = 42^2– 1750 = 1764 – 1750 = 14

The required perfect square is 1764 and $\sqrt{1764} = 42$

(iii) The square root of 252 can be calculated by long division method asfollows.

	15
1	$\overline{2}\,\overline{52}$ -1
25	152 125
	27

The remainder is 27. It represents that the square of 15 is less than 252. The next number is 16 and 16^2= 256

Hence, number to be added to 252 = 16^2– 252 = 256 – 252 = 4

The required perfect square is 256 and $\sqrt{256} = 16$

(iv) The square root of 1825 can be calculated by long division method asfollows.

	42
4	$\overline{18}\,\overline{25}$ -16

82	225 164
	61

The remainder is 61. It represents that the square of 42 is less than 1825. The next number is 43 and 43^2= 1849

Hence, number to be added to 1825 = 43^2– 1825 = 1849 – 1825 = 24

The required perfect square is 1849 and $\sqrt{1849} = 43$

(v) The square root of 6412 can be calculated by long division method asfollows.

	80
8	$\overline{64}\overline{12}$ –64
160	012 0
	12

The remainder is 12.

It represents that the square of 80 is less than 6412. The next number is 81 and 81^2= 6561

Hence, number to be added to 6412 = 81^2– 6412 = 6561 – 6412 = 149

The required perfect square is 6561 and $\sqrt{6561} = 81$

Question 6:

Find the length of the side of a square whose area is 441 m^2. Answer:

Let the length of the side of the square be *x* m. Area of square = $(x)^2$= 441 m^2

$x = \sqrt{441}$

The square root of 441 can be calculated asfollows.

	21
2	$\overline{4}\,\overline{41}$ -4
41	041 41
	0

$\therefore \quad x = 21 \text{ m}$

Hence, the length of the side of the square is 21m.

Question 7:

In a right triangle ABC, ∴B = 90°.

(a) If AB = 6 cm, BC = 8 cm, findAC

(b) If AC = 13 cm, BC = 5 cm, find AB

Answer:

(a) ΔABC is right-angled at B.

Therefore, by applying Pythagoras theorem, we obtain $AC^2 =$

$AB^2 + BC^2$

$AC^2 = (6 \text{ cm})^2 + (8 \text{ cm})^2$

$AC^2 = (36 + 64) \text{ cm}^2 = 100 \text{ cm}^2$

AC = $\left(\sqrt{100}\right) \text{ cm} = \left(\sqrt{10 \times 10}\right) \text{ cm}$

AC = 10 cm

(b) ΔABC is right-angled atB.

Therefore, by applying Pythagoras theorem, we obtain $AC^2 =$

$AB^2 + BC^2$

$(13 \text{ cm})^2 = (AB)^2 + (5 \text{ cm})^2$

$AB^2 = (13 \text{ cm})^2 - (5 \text{ cm})^2 = (169 - 25) \text{ cm}^2 = 144 \text{ cm}^2$

AB = $\left(\sqrt{144}\right)\ \text{cm} = \left(\sqrt{12\times12}\right)\ \text{cm}$

AB = 12 cm

Question 8:

A gardener has 1000 plants. He wants to plant these in such a way that the number of rows and the number of columns remain same. Find the minimum number of plants he needs more for this.

Answer:

It is given that the gardener has 1000 plants. The number of rows and the number of columns is thesame.

We have to find the number of more plants that should be there, so that when the gardener plants them, the number of rows and columns are same.

That is, the number which should be added to 1000 to make it a perfect square has to becalculated.

The square root of 1000 can be calculated by long division method as follows.

	31
3	$\overline{10}\,\overline{00}$ -9
61	100 61
	39

The remainder is 39. It represents that the square of 31 is less than 1000. The next number is 32 and 32^2= 1024

Hence, number to be added to 1000 to make it a perfect square

= 32^2– 1000 = 1024 − 1000 = 24

Thus, the required number of plants is 24.

Question 9:

These are 500 children in a school. For a P.T. drill they have to stand in such a manner that the number of rows is equal to number of columns. How many children would be left out in this arrangement?

Answer:

It is given that there are 500 children in the school. They have to stand for a P.T. drill such that the number of rows is equal to the number ofcolumns.

The number of children who will be left out in this arrangement has to be calculated. That is, the number which should be subtracted from 500 to make it a perfect square has to be calculated.

The square root of 500 can be calculated by long division method as follows.

	22
2	$\overline{5}\,\overline{00}$ -4
42	100 84
	16

The remainder is 16.

It shows that the square of 22 is less than 500 by 16. Therefore, if we subtract 16 from 500, we will obtain a perfect square.

Required perfect square = 500 − 16 = 484

Thus, the number of children who will be left out is 16.

Exercise 7.1

Question 1:

Which of the following numbers are notperfect cubes?

(i) 216

(ii) 128

(iii) 1000

(iv) 100 (v)

46656

Answer:

(i) The prime factorisation of 216 is asfollows.

2	216
2	108
2	54
3	27
3	9
3	3
	1

$216 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} = 2^3 \times 3^3$

Here, as each prime factor is appearing as many times as a perfect multiple of 3, therefore, 216 is a perfect cube.

(ii) The prime factorisation of 128 is asfollows.

2	128
2	64

2	32
2	16
2	8
2	4
2	2
	1

128 = 2 × 2 × 2× 2 × 2 × 2× 2

Here, each prime factor is not appearing as many times as a perfect multiple of 3. One 2 is remaining after grouping the triplets of 2. Therefore, 128 is not a perfect cube.

(iii) The prime factorisation of 1000 is asfollows.

2	1000
2	500
2	250
5	125
5	25
5	5
	1

1000 = 2 × 2 × 2× 5 × 5 × 5

Here, as each prime factor is appearing as many times as a perfect multiple of 3, therefore, 1000 is a perfect cube.

(iv) The prime factorisation of 100 is asfollows.

2	100
2	50
5	25
5	5
	1

100 = 2 × 2 × 5 × 5

Here, each prime factor is not appearing as many times as a perfect multiple of 3. Two 2s and two 5s are remaining after grouping the triplets. Therefore, 100 is not a perfect cube.

(v) The prime factorisation of 46656 is asfollows.

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81

3	27
3	9
3	3
	1

46656 = 2 × 2 × 2× 2 × 2 × 2× 3 × 3 × 3× 3 × 3 × 3

Here, as each prime factor is appearing as many times as a perfect multiple of 3, therefore, 46656 is a perfect cube.

Question 2:

Find the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube.

(i) 243

(ii) 256

(iii) 72

(iv) 675

(v) 100

Answer:

(i) 243 = 3 × 3 × 3× 3 × 3

Here, two 3s are left which are not in a triplet. To make 243 a cube, one more 3 is required.

In that case, 243 × 3 = 3 × 3 × 3× 3 × 3 × 3= 729 is a perfect cube.

Hence, the smallest natural number by which 243 should be multiplied to make it a perfect cube is 3.

(ii) 256 = 2 × 2 × 2× 2 × 2 × 2× 2 × 2

Here, two 2s are left which are not in a triplet. To make 256 a cube, one more 2 is required.

Then, we obtain

256 × 2 = 2 × 2 × 2× 2 × 2 × 2× 2 × 2 × 2= 512 is a perfect cube.

Hence, the smallest natural number by which 256 should be multiplied to make it a perfect cube is 2.

(iii) 72 = 2 × 2 × 2× 3 × 3

Here, two 3s are left which are not in a triplet. To make 72 a cube, one more 3 is required.

Then, we obtain

72 × 3 = 2 × 2 × 2× 3 × 3 × 3= 216 is a perfect cube.

Hence, the smallest natural number by which 72 should be multiplied to make it a perfect cube is 3.

(iv) 675 = 3 × 3 × 3× 5 × 5

Here, two 5s are left which are not in a triplet. To make 675 a cube, one more 5 is required.

Then, we obtain

675 × 5 = 3 × 3 × 3× 5 × 5 × 5= 3375 is a perfect cube.

Hence, the smallest natural number by which 675 should be multiplied to make it a perfect cube is 5.

(v) 100 = 2 × 2 × 5 × 5

Here, two 2s and two 5s are left which are not in a triplet. To make 100 a cube, we require one more 2 and one more 5.

Then, we obtain

100 × 2 × 5 = 2 × 2 × 2× 5 × 5 × 5= 1000 is a perfect cube

Hence, the smallest natural number by which 100 should be multiplied to make it a perfect cube is 2 × 5 = 10.

Question 3:

Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube.

(i) 81

(ii) 128

(iii) 135

(iv) 192

(v) 704

Answer:

(i) 81 = 3 × 3 × 3× 3

Here, one 3 is left which is not in a triplet.

If we divide 81 by 3, then it will become a perfect cube. Thus, 81

÷ 3 = 27 = 3 × 3 × 3is a perfect cube.

Hence, the smallest number by which 81 should be divided to make it a perfect cube is 3.

(ii) 128 = 2 × 2 × 2× 2 × 2 × 2× 2

Here, one 2 is left which is not in a triplet.

If we divide 128 by 2, then it will become a perfect cube.

Thus, 128 ÷ 2 = 64 = 2 × 2 × 2× 2 × 2 × 2is a perfect cube.

Hence, the smallest number by which 128 should be divided to make it a perfect cube is2.

(iii) 135 = 3 × 3 × 3× 5

Here, one 5 is left which is not in a triplet.

If we divide 135 by 5, then it will become a perfect cube. Thus,

135 ÷ 5 = 27 = 3 × 3 × 3is a perfect cube.

Hence, the smallest number by which 135 should be divided to make it a perfect cube is5.

(iv) 192 = 2 × 2 × 2× 2 × 2 × 2× 3

Here, one 3 is left which is not in a triplet.

If we divide 192 by 3, then it will become a perfect cube.

Thus, 192 ÷ 3 = 64 = 2 × 2 × 2× 2 × 2 × 2is a perfect cube.

Hence, the smallest number by which 192 should be divided to make it a perfect cube is3.

(v) 704 = 2 × 2 × 2× 2 × 2 × 2× 11

Here, one 11 is left which is not in a triplet.

If we divide 704 by 11, then it will become a perfect cube.

Thus, 704 ÷ 11 = 64 = 2 × 2 × 2× 2 × 2 × 2is a perfect cube.

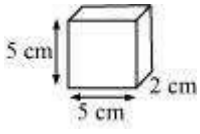
Hence, the smallest number by which 704 should be divided to make it a perfect cube is11.

Question 4:

Parikshit makes a cuboid of plasticine of sides 5 cm, 2 cm, 5 cm. How many such cuboids will he need to form a cube?

Answer:

Here, some cuboids of size 5 × 2 × 5 are given.



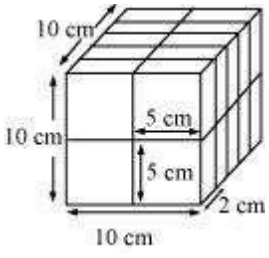
When these cuboids are arranged to form a cube, the side of this cube so formed will be a common multiple of the sides (i.e., 5, 2, and 5) of the given cuboid.

LCM of 5, 2, and 5 = 10

Let us try to make a cube of 10 cm side.

For this arrangement, we have to put 2 cuboids along with its length, 5 along with its width, and 2 along with its height.

Total cuboids required according to this arrangement = 2 × 5 × 2 = 20 With the help of 20 cuboids of such measures, a cube is formed as follows.



Alternatively

Volume of the cube of sides 5 cm, 2 cm, 5 cm

= 5 cm × 2 cm × 5 cm = (5 × 5 × 2) cm^3

Here, two 5s and one 2 are left which are not in a triplet.

If we multiply this expression by 2 × 2 × 5 = 20, then it will become a perfect cube. Thus, (5 × 5 × 2 × 2 × 2 × 5) = (5 × 5 × 5× 2 × 2 × 2) = 1000 is a perfect cube. Hence, 20 cuboids of 5 cm, 2 cm, 5 cm are required to form a cube.

Exercise 7.2

Question 1:

Find the cube root of each of the following numbers by prime factorisation method.

(i) 64

(ii) 512

(iii) 10648

(iv) 27000

(v) 15625

(vi) 13824

(vii) 110592

(viii) 46656

(ix) 175616

(x) 91125

Answer:

(i) Prime factorisationof $64 = \underline{2\times2\times2}\times\underline{2\times2\times2}$

$\therefore \sqrt[3]{64} = 2\times2 = 4$

(ii) Prime factorisationof $512 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{2\times2\times2}$

$\therefore \sqrt[3]{512} = 2\times2\times2 = 8$

(iii) Prime factorisationof $10648 = \underline{2\times2\times2}\times\underline{11\times11\times11}$

$\therefore \sqrt[3]{10648} = 2\times11 = 22$

(iv) Prime factorisationof $27000 = \underline{2\times2\times2}\times\underline{3\times3\times3}\times\underline{5\times5\times5}$

$\therefore \sqrt[3]{27000} = 2\times3\times5 = 30$

(v) Prime factorisationof $15625 = \underline{5\times5\times5}\times\underline{5\times5\times5}$

$\therefore \sqrt[3]{15625} = 5\times5 = 25$

(vi) Prime factorisationof $13824 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{3\times3\times3}$

$\therefore \sqrt[3]{13824} = 2\times2\times2\times3 = 24$

(vii) Prime factorisationof $110592 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{3\times3\times3}$

$\therefore \sqrt[3]{110592} = 2\times2\times2\times2\times3 = 48$

(viii) Prime factorisationof $46656 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{3\times3\times3}\times\underline{3\times3\times3}$

$\therefore \sqrt[3]{46656} = 2\times2\times3\times3 = 36$

(ix) Prime factorisationof $175616 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{2\times2\times2}\times\underline{7\times7\times7}$

$\therefore \sqrt[3]{175616} = 2\times2\times2\times7 = 56$

(x) Prime factorisationof $91125 = \underline{3\times3\times3}\times\underline{3\times3\times3}\times\underline{5\times5\times5}$

$\therefore \sqrt[3]{91125} = 3\times3\times5 = 45$

Question 2:

State true or false.

(i) Cube of any odd number iseven.

(ii) A perfect cube does not end with twozeroes.

(iii) If square of a number ends with 5, then its cube ends with25.

(iv) There is no perfect cube which ends with8.

(v) The cube of a two digit number may be a three digitnumber.

(vi) The cube of a two digit number may have seven or moredigits.

(vii) The cube of a single digit number may be a single digit number. Answer:

For finding the cube of any number, the number is first multiplied with itself and this product is again multiplied with this number.

(i) False. When we find out the cube of an odd number, we will find an odd number as the result because the unit place digit of an odd number is odd and we are multiplying three odd numbers. Therefore, the product will be again an odd number. For example, the cube of 3 (i.e., an odd number) is 27, which is again an odd number.

(ii) True. Perfect cube will end with a certain number of zeroes that are always a perfect multiple of3.

Foe example, the cube of 10 is 1000 and there are 3 zeroes at the end of it. The cube of 100 is 1000000 and there are 6 zeroes at the end of it.

(iii) False. It is not always necessary that if the square of a number ends with 5, then its cube will end with25.

For example, the square of 25 is 625 and 625 has its unit digit as 5. The cube of 25 is 15625. However, the square of 35 is 1225 and also has its unit place digit as 5 but the cube of 35 is 42875 which does not end with25.

(iv) False. There are many cubes which will end with 8. The cubes of all the numbers having their unit place digit as 2 will end with8.

The cube of 12 is 1728 and the cube of 22 is 10648.

(v) False. The smallest two-digit natural number is 10, and the cube of 10 is 1000 which has 4 digits init.

(vi) False. The largest two-digit natural number is 99, and the cube of 99 is 970299 which has 6 digits in it. Therefore, the cube of any two-digit number cannot have 7 or more digits in it.

(vii) True, as the cube of 1 and 2 are 1 and 8respectively.

Question 3:

You are told that 1331 is a perfect cube. Can you guess without factorization what is its cube root? Similarly, guess the cube roots of 4913, 12167, 32768

Answer:

Firstly, we will make groups of three digits starting from the rightmost digit of the numberas $\bar{1}\,\overline{331}$.

There are 2 groups, 1 and 331, in it.

Considering 331,

The digit at its unit place is 1. We know that if the digit 1 is at the end of a perfect cube number, then its cube root will have its unit place digit as 1 only. Therefore, the unit place digit of the required cube root can be taken as 1.

Taking the other group i.e., 1,

The cube of 1 exactly matches with the number of the second group. Therefore, the tens digit of our cube root will be taken as the unit place of the smaller number whose cube is near to the number of the second group i.e., 1 itself. 1 will be taken as tens place of the cube root of1331.

Hence,

The cube $\sqrt[3]{1331} = 11$ has to be calculated.

We will make groups of three digits starting from the rightmost digit of 4913,

as $\overline{4}\,\overline{913}$. The groups are 4 and 913.

Considering the group 913,

The number 913 ends with 3. We know that if the digit 3 is at the end of a perfect cube number, then its cube root will have its unit place digit as 7 only. Therefore, the unit place digit of the required cube root is taken as 7.

Taking the other group i.e., 4, We know that, $1^3 = 1$ and $2^3 = 8$

Also, $1 < 4 < 8$

Therefore, 1 will be taken at the tens place of the required cube root.

Thus, $\sqrt[3]{4913} = 17$

The cube root of 12167 has to be calculated.

We will make groups of three digits starting from the rightmost digit of the number

12167, as $\overline{12}\,\overline{167}$. The groups are 12 and 167. Considering the group 167,

167 ends with 7. We know that if the digit 7 is at the end of a perfect cube number, then its cube root will have its unit place digit as 3 only. Therefore, the unit place digit of the required cube root can be taken as 3.

Taking the other group i.e., 12, We know that, $2^3 = 8$ and $3^3 = 27$

Also, $8 < 12 < 27$

2 is smaller between 2 and 3. Therefore, 2 will be taken at the tens place of the required cube root.

Thus, $\sqrt[3]{12167} = 23$

The cube root of 32768 has to be calculated.

We will make groups of three digits starting from the rightmost digit of the number

32768,as . $\overline{32}\,\overline{768}$

Considering the group 768,

768 ends with 8. We know that if the digit 8 is at the end of a perfect cube number, then its cube root will have its unit place digit as 2 only. Therefore, the unit place digit of the required cube root will be taken as 2.

Taking the other group i.e., 32,

We know that, $3^3 = 27$ and $4^3 = 64$

Also, $27 < 32 < 64$

3 is smaller between 3 and 4. Therefore, 3 will be taken at the tens place of the required cuberoot.

Thus, $\sqrt[3]{32768} = 32$

Exercise 8.1

Question 1:

Find the ratio of the following:

(a) Speed of a cycle 15 km per hour to the speed of scooter 30 km perhour.

(b) 5 m to 10km

(c) 50 paise to Rs 5

Answer:

(a) Ratio of the speed of cycle to the speed ofscooter $= \frac{15}{30} = 1:2$

(b) Since 1 km = 1000m,

Required ratio $= \frac{5\,\text{m}}{10\ \text{km}} = \frac{5\,\text{m}}{10 \times 1000\,\text{m}} = 1:2000$

(c) Since Re 1 = 100paise,

Required ratio $= \frac{50\,\text{paise}}{\text{Rs}\,5} = \frac{50\,\text{paise}}{500\,\text{paise}} = 1:10$

Question 2:

Convert the following ratios to percentages. (a)

3:4 (b) 2:3

Answer:

(a) $3:4 = \frac{3}{4} = \frac{3}{4} \times \frac{100}{100} = \frac{3}{4} \times 100\% = 75\%$

(b) $2:3 = \frac{2}{3} = \frac{2}{3} \times \frac{100}{100} = \frac{2}{3} \times 100\% = \frac{200}{3}\%$

$= \left(\frac{66 \times 3 + 2}{3}\right)\% = 66\frac{2}{3}\%$

Question 3:

72% of 25 students are good in mathematics. How many are not good in mathematics?

Answer:

It is given that 72% of 25 students are good in mathematics.

Therefore,

Percentage of students who are not good in mathematics = (100 − 72)%

= 28%

∴Number of students who are not good in mathematics = $\frac{28}{100} \times 25$

= 7

Thus, 7 students are not good in mathematics.

Question 4:

A football team won 10 matches out of the total number of matches they played. If their win percentage was 40, then how many matches did they play in all?

Answer:

Let the total number of matches played by the team be *x*.

It is given that the team won 10 matches and the winning percentage of the team was 40%.

Therefore,

$$\frac{40}{100} \times x = 10$$

$$x = 10 \times \frac{100}{40}$$

$$x = 25$$

Thus, the team played 25 matches.

Question 5:

If Chameli had Rs 600 left after spending 75% of her money, how much did she have in the beginning?

Answer:

Let the amount of money which Chameli had in the beginning be *x*. It is given that after spending 75% of Rs *x*, she was left with Rs 600. Therefore,

(100 − 75)% of x = Rs 600

Or, 25 % of x = Rs 600

$$\frac{25}{100} \times x = \text{Rs } 600$$

$$x = \text{Rs} \left(600 \times \frac{100}{25} \right) = \text{Rs } 2400$$

Thus, she had Rs 2400 in the beginning.

Question 6:

If 60% people in city like cricket, 30% like football and the remaining like other games, then what per cent of the people like other games? If the total number of people are 50 lakh, find the exact number who like each type of game.

Answer:

Percentage of people who like other games = (100 − 60 − 30)%

= (100 − 90)% = 10 %

Total number of people = 50 lakh

Therefore, number of people wholikecricket $= \left(\frac{60}{100} \times 50 \right) \text{ lakh}$ = 30lakh

Number of people wholikefootball $= \left(\frac{30}{100} \times 50 \right) \text{ lakh}$ = 15lakh

Number of people who likeothergames $= \left(\frac{10}{100} \times 50 \right) \text{ lakh}$ = 5lakh

Exercise 8.2

Question 1:

A man got a 10% increase in his salary. If his new salary is Rs 1,54,000, find his original salary.

Answer:

Let the original salary be *x*. It is given that the new salary is Rs 1,54,000. Original

salary + Increment = New salary

However, it is given that the increment is 10% of the original salary. Therefore,

Thus, the original salary was Rs 1,40,000.

$$x+\frac{10}{100}\times x=154000$$

$$\frac{110x}{100}=154000$$

$$x=\left(154000\times\frac{100}{110}\right)$$

$$x=140000$$

Question 2:

On Sunday 845 people went to the Zoo. On Monday only 169 people went. What is the per cent decrease in the people visiting the zoo on Monday?

Answer:

It is given that on Sunday, 845 people went to the zoo and on Monday, 169 people went.

Decrease in the number of people = 845 − 169 = 676

$$\text{Percentage decrease}=\left(\frac{\text{Decrease in the number of people}\times 100}{\text{Number of people who went to zoo on sunday}}\right)\%$$

$$=\left(\frac{676}{845}\times 100\right)\%$$

$$=80\%$$

Question 3:

A shopkeeper buys 80 articles for Rs 2,400 and sells them for a profit of 16%. Find the selling price of one article.

Answer:

It is given that the shopkeeper buys 80 articles for Rs 2,400.

Cost of one article = $\text{Rs } \frac{2400}{80} = \text{Rs } 30$

Profit percent = 16

$$\text{Profit Percent} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$16 = \frac{\text{Profit}}{\text{Rs } 30} \times 100$$

$$\text{Profit } = \text{Rs} \left(\frac{16 \times 30}{100} \right) = \text{Rs } 4.80$$

Selling price of one article = C.P. + Profit = Rs (30 + 4.80) = Rs 34.80

Question 4:

The cost of an article was Rs 15,500. Rs 450 were spent on its repairs. If it is sold for a profit of 15%, find the selling price of the article.

Answer:

Total cost of an article = Cost + Overhead expenses

= Rs 15500 + Rs 450

= Rs 15950

$$\text{Profit } \% = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$15 = \frac{\text{Profit}}{\text{Rs } 15950} \times 100$$

$$\text{Profit} = \text{Rs} \left(\frac{15950 \times 15}{100} \right) = \text{Rs } 2392.50$$

∴Selling price of the article = C.P. + Profit = Rs (15950 + 2392.50)

= Rs 18342.50

Question 5:

A VCR and TV were bought for Rs 8,000 each. The shopkeeper made a loss of 4% on the VCR and a profit of 8% on the TV. Find the gain or loss percent on the whole transaction.

Answer:

C.P. of a VCR = Rs 8000

The shopkeeper made a loss of 4 % on VCR. This

means if C.P. is Rs 100, then S.P. is Rs 96.

When C.P. is Rs 8000,S.P.= $\text{Rs}\left(\frac{96}{100}\times 8000\right)$ = Rs7680

C.P. of a TV = Rs 8000

The shopkeeper made a profit of 8 % on TV.

This means that if C.P. is Rs 100, then S.P. is Rs 108.

When C.P. is Rs 8000,S.P.= $\text{Rs}\left(\frac{108}{100}\times 8000\right)$ = Rs 8640

Total S.P. = Rs 7680 + Rs 8640 = Rs16320

Total C.P. = Rs 8000 + Rs 8000 = Rs16000

Since total S.P.> total C.P., there was a profit. Profit =

Rs 16320 − Rs 16000 = Rs 320

$$\text{Profit }\% = \frac{\text{Profit}}{\text{C.P.}}\times 100$$
$$= \frac{320}{16000}\times 100 = 2\%$$

Therefore, the shopkeeper had a gain of 2% on the whole transaction.

Question 6:

During a sale, a shop offered a discount of 10% on the marked prices of all the items. What would a customer have to pay for a pair of jeans marked at Rs 1450 and two shirts marked at Rs 850each?

Answer:

Total marked price = Rs (1,450 + 2 × 850) = Rs (1,450 +1,700) = Rs 3,150

Given that, discount % = 10%

Discount = $\text{Rs}\left(\frac{10}{100}\times 3150\right) = \text{Rs } 315$

Also, Discount = Marked price − Sale price Rs

315 = Rs 3150 − Sale price

∴ Sale price = Rs (3150 − 315) = Rs 2835 Thus, the

customer will have to pay Rs 2,835. Question 7:

A milkman sold two of his buffaloes for Rs 20,000 each. On one he made a gain of 5% and on the other a loss of 10%. Find his overall gain or loss.

(Hint: Find CP of each) Answer:

S.P. of each buffalo = Rs 20000

The milkman made a gain of 5% while selling one buffalo. This

means if C.P. is Rs 100, then S.P. is Rs 105.

C.P. of onebuffalo= $\text{Rs}\left(20000\times\frac{100}{105}\right)$ = Rs 19,047.62

Also, the second buffalo was sold at a loss of 10%. This

means if C.P. is Rs 100, then S.P. is Rs90.

∴C.P. of otherbuffalo= $\text{Rs}\left(20000\times\frac{100}{90}\right)$ = Rs 22222.22

Total C.P. = Rs 19047.62 + Rs 22222.22 = Rs 41269.84 Total S.P.

= Rs 20000 + Rs 20000 = Rs40000

Loss = Rs 41269.84 − Rs 40000 = Rs1269.84

Thus, the overall loss of milkman was Rs 1,269.84.

Question 8:

The price of a TV is Rs 13,000. The sales tax charged on it is at the rate of 12%. Find the amount that Vinod will have to pay if he buys it,

Answer:

On Rs 100, the tax to be paid = Rs 12

On Rs 13000, the tax to be paid will be $= \text{Rs}\left(\frac{12}{100}\times 13000\right)$

= Rs 1560

Required amount = Cost + Sales Tax = Rs 13000 + Rs 1560

= Rs 14560

Thus, Vinod will have to pay Rs 14,560 for the T.V.

Question 9:

Arun bought a pair of skates at a sale where the discount given was 20%. If the amount he pays is Rs 1,600, find the marked price.

Answer:

Let the marked price be *x*.

$$\text{Discount percent} = \frac{\text{Discount}}{\text{Marked price}}\times 100$$

$$20 = \frac{\text{Discount}}{x}\times 100$$

$$\text{Discount} = \frac{20}{100}\times x = \frac{1}{5}x$$

Also,

Discount = Marked price − Saleprice

$$\frac{1}{5}x = x - \text{Rs } 1600$$

$$x - \frac{1}{5}x = \text{Rs } 1600$$

$$\frac{4}{5}x = \text{Rs } 1600$$

$$x = \text{Rs}\left(1600\times\frac{5}{4}\right) = \text{Rs } 2000$$

Thus, the marked price was Rs2000.

Question 10:

I purchased a hair-dryer for Rs 5,400 including 8% VAT. Find the price before VAT was added.

Answer:

The price includes VAT.

Thus, 8% VAT means that if the price without VAT is Rs 100, then price including VAT will be Rs108.

When price including VAT is Rs 108, original price = Rs 100

$$\text{When price including VAT is Rs 5400, original price } = \text{Rs}\left(\frac{100}{108}\times 5400\right)$$
$$= \text{Rs } 5000$$

Thus, the price of the hair-dryer before the addition of VAT was Rs 5,000.

Exercise 8.3

Question 1:

Calculate the amount and compound interest on

(a) Rs 10800 for 3yearsat $12\frac{1}{2}\%$ per annum compoundedannually.

(b) Rs18000for $2\frac{1}{2}$ years at 10% per annum compoundedannually.

(c) Rs62500 for $1\frac{1}{2}$ years at 8% per annum compounded halfyearly.

(d) Rs 8000 for 1 year at 9% per annum compound halfyearly.

(You could use the year by year calculation using SI formula to verify)

(e) Rs 10000 for 1 year at 8% per annum compounded half yearly. Answer:

(a) Principal (P) = Rs 10,800

Rate(R)= $12\frac{1}{2}\%$ = $\frac{25}{2}$ % (annual)

Number of years (n) = 3

Amount, A = $P\left(1+\frac{R}{100}\right)^n$

$$= \text{Rs}\left[10800\left(1+\frac{25}{200}\right)^3\right]$$

$$= \text{Rs}\left[10800\left(\frac{225}{200}\right)^3\right]$$

$$= \text{Rs}\left(10800\times\frac{225}{200}\times\frac{225}{200}\times\frac{225}{200}\right)$$

$$= \text{Rs } 15377.34375$$

$$= \text{Rs } 15377.34 \quad (\text{approximately})$$

C.I. = A − P = Rs (15377.34 − 10800) = Rs 4,577.34

(b) Principal (P) = Rs 18,000

Rate (R) = 10%annual

Number of years (n) = $2\frac{1}{2}$ years

The amount for 2 years and 6 months can be calculated by first calculating the amount for 2 years using the compound interest formula, and then calculating the simple interest for 6 months on the amount obtained at the end of 2 years.

Firstly, the amount for 2 years has to be calculated.

$$A = \text{Rs}\left[18000\left(1+\frac{1}{10}\right)^2\right] = \text{Rs}\left(18000\times\frac{11}{10}\times\frac{11}{10}\right) = \text{Rs } 21780$$

By taking Rs 21780 as principal, the S.I. forthenext $\frac{1}{2}$ year will becalculated.

$$\text{S.I.} = \text{Rs}\left(\frac{21780\times\frac{1}{2}\times10}{100}\right) = \text{Rs } 1089$$

∴ Interest for the first 2 years = Rs (21780 − 18000) = Rs 3780

And interest forthenext $\frac{1}{2}$ year = Rs1089

∴ Total C.I. = Rs 3780 + Rs 1089 = Rs 4,869

A = P + C.I. = Rs 18000 + Rs 4869 = Rs 22,869

(c) Principal (P) = Rs 62,500

Rate = 8% per annum or 4% per half year

Number of years = $1\frac{1}{2}$

There will be 3 halfyearsin $1\frac{1}{2}$ years.

$$A = P\left(1+\frac{R}{100}\right)^{n} = Rs\left[62500\left(1+\frac{4}{100}\right)^{3}\right]$$

$$= Rs\left(62500\times\frac{26}{25}\times\frac{26}{25}\times\frac{26}{25}\right)$$

$$= Rs\ 70304$$

C.I. = A − P = Rs 70304 − Rs 62500 = Rs 7,804

(d) Principal (P) = Rs8000

Rate of interest = 9% perannumor $\frac{9}{2}$ % per half year

Number of years = 1year

There will be 2 half years in 1 year.

$$A = P\left(1+\frac{R}{100}\right)^{n}$$

$$= Rs\left[8000\left(1+\frac{9}{200}\right)^{2}\right]$$

$$= Rs\left[8000\left(\frac{209}{200}\right)^{2}\right] = Rs\ 8,736.20$$

C.I. = A − P = Rs 8736.20 − Rs 8000 = Rs 736.20

(e) Principal (P) = Rs 10,000

Rate = 8% per annum or 4% per half year Number

of years = 1 year

There are 2 half years in 1 year.

$$A = P\left(1+\frac{R}{100}\right)^{n}$$

$$= Rs\left[10000\left(1+\frac{4}{100}\right)^{2}\right] = Rs\left[10000\left(1+\frac{1}{25}\right)^{2}\right]$$

$$= Rs\left(10000\times\frac{26}{25}\times\frac{26}{25}\right) = Rs\ 10,816$$

C.I. = A − P = Rs 10816 − Rs 10000 = Rs 816

Question 2:

Kamala borrowed Rs 26400 from a Bank to buy a scooter at a rate of 15% p.a. compounded yearly. What amount will she pay at the end of 2 years and 4 months to clear theloan?

(Hint: Find A for 2 years with interest is compounded yearly and then find SI on the

2^{nd}yearamountfor $\frac{4}{12}$ years.)

Answer:

Principal (P) = Rs 26,400 Rate

(R) = 15% per annum

Number of years (*n*) = $2\frac{4}{12}\text{years}$

The amount for 2 years and 4 months can be calculated by first calculating the amount for 2 years using the compound interest formula, and then calculating the simple interest for 4 months on the amount obtained at the end of 2 years.

Firstly, the amount for 2 years has to be calculated.

$$A = \text{Rs}\left[26400\left(1+\frac{15}{100}\right)^2\right] = \text{Rs}\left[26400\left(1+\frac{3}{20}\right)^2\right]$$

$$= \text{Rs}\left(26400\times\frac{23}{20}\times\frac{23}{20}\right) = \text{Rs } 34,914$$

By taking Rs 34,914 as principal, the S.I. forthenext $\frac{1}{3}\text{years}$ will becalculated.

$$\text{S.I.} = \text{Rs}\left(\frac{34914\times\frac{1}{3}\times15}{100}\right) = \text{Rs } 1,745.70$$

Interest for the first two years = Rs (34914 − 26400) = Rs 8,514

And interest forthenext $\frac{1}{3}$ year = Rs1,745.70

Total C.I. = Rs (8514 + Rs 1745.70) = Rs 10,259.70

Amount = P + C.I. = Rs 26400 + Rs 10259.70 = Rs 36,659.70

Question 3:

Fabina borrows Rs 12,500 at 12% per annum for 3 years at simple interest and Radha borrows the same amount for the same time period at 10% per annum, compounded annually. Who pays more interest and by how much?

Answer:

Interest paid by Fabina = $\frac{P \times R \times T}{100}$

$$= \text{Rs}\left(\frac{12500 \times 12 \times 3}{100}\right) = \text{Rs } 4,500$$

Amount paid by Radha at the end of 3 years = A = $P\left(1+\frac{R}{100}\right)^n$

$$A = \text{Rs}\left[12500\left(1+\frac{10}{100}\right)^3\right]$$

$$= \text{Rs}\left(12500 \times \frac{110}{100} \times \frac{110}{100} \times \frac{110}{100}\right) = \text{Rs } 16,637.50$$

C.I. = A – P = Rs 16637.50 – Rs 12500 = Rs 4,137.50

The interest paid by Fabina is Rs 4,500 and by Radha is Rs 4,137.50. Thus,

Fabina pays more interest.

Rs 4500 – Rs 4137.50 = Rs 362.50

Hence, Fabina will have to pay Rs 362.50 more.

Question 4:

I borrowed Rs 12000 from Jamshed at 6% per annum simple interest for 2 years. Had I borrowed this sum at 6% per annum compound interest, what extra amount would I have topay?

Answer:

P = Rs 12000

R = 6% per annum T =

2 years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \text{Rs}\left(\frac{12000 \times 6 \times 2}{100}\right) = \text{Rs } 1,440$$

To find the compound interest, the amount (A) has to be calculated.

$$A = P\left(1+\frac{R}{100}\right)^{n} = \text{Rs}\left[12000\left(1+\frac{6}{100}\right)^{2}\right]$$

$$= \text{Rs}\left[12000\left(1+\frac{3}{50}\right)^{2}\right] = \text{Rs}\left(12000 \times \frac{53}{50} \times \frac{53}{50}\right)$$

$$= \text{Rs } 13,483.20$$

∴C.I. = A − P = Rs 13483.20 − Rs 12000 = Rs 1,483.20 C.I. − S.I. =

Rs 1,483.20 − Rs 1,440 = Rs 43.20

Thus, the extra amount to be paid is Rs 43.20.

Question 5:

Vasudevan invested Rs 60000 at an interest rate of 12% per annum compounded half yearly.

What amount would heget

(i) after 6months?

(ii) after 1 year?

Answer:

(i) P = Rs 60,000

Rate = 12% per annum = 6% per half year

n = 6 months = 1 half year

$$A = P\left(1+\frac{R}{100}\right)^{n}$$

$$= \text{Rs}\left[60000\left(1+\frac{6}{100}\right)^{1}\right] = \text{Rs}\left(60000 \times \frac{106}{100}\right) = \text{Rs } 63,600$$

(ii) There are 2 half years in 1 year.

$n = 2$

$$A = \text{Rs}\left[60000\left(1+\frac{6}{100}\right)^{2}\right] = \text{Rs}\left(60000\times\frac{106}{100}\times\frac{106}{100}\right) = \text{Rs } 67,416$$

Question 6:

Arif took a loan of Rs 80,000 from a bank. If the rate of interest is 10% per annum,

find the difference in amounts he would bepayingafter $1\frac{1}{2}$ years if the interestis

(i) Compoundedannually

(ii) Compounded half yearly

Answer:

(i) P = Rs 80,000

R = 10% per annum

$n = 1\frac{1}{2}$ years

The amount for 1 year and 6 months can be calculated by first calculating the amount for 1 year using the compound interest formula, and then calculating the simple interest for 6 months on the amount obtained at the end of 1year.

Firstly, the amount for 1 year has to be calculated.

$$A = \text{Rs}\left[80000\left(1+\frac{10}{100}\right)^{1}\right]$$

$$= \text{Rs}\left[80000\left(1+\frac{1}{10}\right)\right] = \text{Rs}\left(80000\times\frac{11}{10}\right) = \text{Rs } 88,000$$

By taking Rs 88,000 as principal, the SI for the next year will be $\frac{1}{2}$ calculated.

$$\text{S.I.} = \frac{P\times R\times T}{100} = \text{Rs}\left(\frac{88000\times 10\times\frac{1}{2}}{100}\right) = \text{Rs } 4,400$$

Interest for the first year = Rs 88000 − Rs 80000 = Rs 8,000

And interest forthenext $\frac{1}{2}$ year = Rs 4,400 Total

C.I. = Rs 8000 + Rs 4,400 = Rs1,2400

A = P + C.I. = Rs (80000 + 12400) = Rs 92,400

(ii) The interest is compounded half yearly. Rate =

10% per annum = 5% per half year

There will be three halfyearsin $1\frac{1}{2}$ years.

$$A = \text{Rs}\left[80000\left(1+\frac{5}{100}\right)^3\right] = \text{Rs}\left[80000\left(1+\frac{1}{20}\right)^3\right]$$

$$= \text{Rs}\left(80000\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}\right) = \text{Rs } 92,610$$

Difference between the amounts = Rs 92,610 − Rs 92,400 = Rs 210

Question 7:

Maria invested Rs 8,000 in a business. She would be paid interest at 5% per annum compounded annually. Find.

(i) The amount credited against her name at the end of the secondyear

(ii) The interest for the 3rdyear.

Answer:

(i) P = Rs 8,000

R = 5% per annum

n = 2 years

$$A = \text{Rs}\left[8000\left(1+\frac{5}{100}\right)^2\right] = \text{Rs}\left(8000\left(1+\frac{1}{20}\right)^2\right)$$

$$= \text{Rs}\left(8000\times\frac{21}{20}\times\frac{21}{20}\right) = \text{Rs } 8,820$$

(ii) The interest for the next one year, i.e. the third year, has to be calculated. By taking Rs 8,820 as principal, the S.I. for the next year will be calculated.

$$\text{S.I.} = \text{Rs}\left(\frac{8820\times5\times1}{100}\right) = \text{Rs } 441$$

Question 8:

Find the amount and the compound interest on Rs 10,000 for years $1\frac{1}{2}$ at 10% per annum, compounded half yearly. Would this interest be more than the interest he would get if it was compounded annually?

Answer:

P = Rs 10,000

Rate = 10% per annum = 5% per half year

n= $1\frac{1}{2}$ years

There will be 3 halfyearsin $1\frac{1}{2}$ years.

$$\text{A} = \text{Rs}\left[10000\left(1+\frac{5}{100}\right)^3\right] = \text{Rs}\left[10000\left(1+\frac{1}{20}\right)^3\right]$$

$$= \text{Rs}\left(10000\times\frac{21}{20}\times\frac{21}{20}\times\frac{21}{20}\right) = \text{Rs } 11{,}576.25$$

C.I. = A − P

= Rs 11576.25 − Rs 10000 = Rs 1,576.25

The amount for 1 year and 6 months can be calculated by first calculating the amount for 1 year using the compound interest formula, and then calculating the simple interest for 6 months on the amount obtained at the end of 1year.

The amount for the first year has to be calculated first.

$$A = \text{Rs}\left[10000\left(1+\frac{10}{100}\right)^{1}\right] = \text{Rs}\left[10000\left(1+\frac{1}{10}\right)\right]$$

$$= \text{Rs}\left(10000\times\frac{11}{10}\right) = \text{Rs } 11,000$$

By taking Rs 11,000 as the principal, the S.I. forthenext $\frac{1}{2}$ year will becalculated.

$$\text{S.I.} = \text{Rs}\left(\frac{11000\times10\times\frac{1}{2}}{100}\right) = \text{Rs } 550$$

∴ Interest for the first year = Rs 11000 − Rs 10000 = Rs 1,000

∴ Total compound interest = Rs 1000 + Rs 550 = Rs 1,550

Therefore, the interest would be more when compounded half yearly than the interest when compoundedannually.

Question 9:

Find the amount which Ram will get on Rs 4,096, he gave it for 18 months at per annum, $12\frac{1}{2}\%$ interest being compounded half yearly.

Answer:

P = Rs 4,096

R= $12\frac{1}{2}\%$ perannum= $\frac{25}{4}\%$ per half year

n = 18 months

There will be 3 half years in 18 months.

Therefore,

$$A = \text{Rs}\left[4096\left(1+\frac{25}{400}\right)^{3}\right] = \text{Rs}\left[4096\left(1+\frac{1}{16}\right)^{3}\right]$$

$$= \text{Rs}\left(4096\times\frac{17}{16}\times\frac{17}{16}\times\frac{17}{16}\right) = \text{Rs } 4,913$$

Thus, the required amount is Rs 4,913.

Question 10:

The population of a place increased to 54000 in 2003 at a rate of 5% per annum

(i) find the population in2001

(ii) what would be its population in 2005?

Answer:

(i) It is given that, population in the year 2003 = 54,000

Therefore,

54000 = (Population in 2001) $\left(1+\frac{5}{100}\right)^2$

Populationin2001 $=54000\times\frac{20}{21}\times\frac{20}{21}$ =48979.59

Thus, the population in the year 2001 was approximately 48,980.

(ii) Population in 2005= $54000\left(1+\frac{5}{100}\right)^2$

$=54000\left(1+\frac{1}{20}\right)^2=54000\times\frac{21}{20}\times\frac{21}{20}=59,535$

Thus, the population in the year 2005 would be 59,535.

Question 11:

In a laboratory, the count of bacteria in a certain experiment was increasing at the rate of 2.5% per hour. Find the bacteria at the end of 2 hours if the count was initially5,06,000.

Answer:

The initial count of bacteria is given as 5,06,000.

Bacteria at the end of 2 hours = $506000\left(1+\frac{2.5}{100}\right)^2$

$$= 506000\left(1+\frac{1}{40}\right)^2 = 506000\times\frac{41}{40}\times\frac{41}{40}$$

$$= 531616.25 = 5,31,616 \text{ (approx.)}$$

Thus, the count of bacteria at the end of 2 hours will be 5,31,616 (approx.).

Question 12:

A scooter was bought at Rs 42,000. Its value depreciated at the rate of 8% per annum. Find its value after one year.

Answer:

Principal = Cost price of the scooter = Rs 42,000

$$= \text{Rs}\left(\frac{42000\times 8\times 1}{100}\right)$$

$$= \text{Rs } 3,360$$

Depreciation = 8% of Rs 42,000 per year

Value after 1 year = Rs 42000 − Rs 3360 = Rs 38,640

Exercise 4.1

Question 1:

Construct the following quadrilaterals.

(i) QuadrilateralABCD

AB = 4.5cm

BC = 5.5 cm

CD = 4 cm

AD = 6 cm

AC = 7 cm

(ii) Quadrilateral JUMP

JU = 3.5cm

UM = 4 cm

MP = 5 cm PJ

= 4.5 cm PU =

6.5 cm

(iii) Parallelogram MORE

OR = 6 cm

RE = 4.5 cm

EO = 7.5 cm

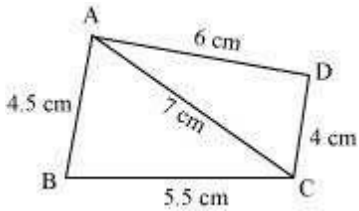
(iv) RhombusBEST

BE = 4.5 cm

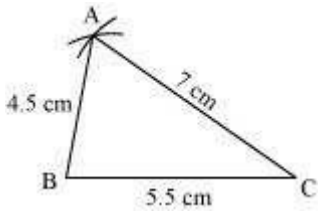
ET = 6 cm

Answer:

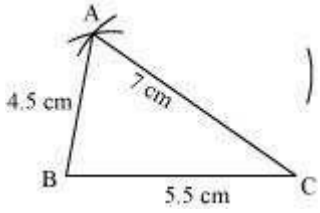
(i) Firstly, a rough sketch of this quadrilateral can be drawn asfollows.



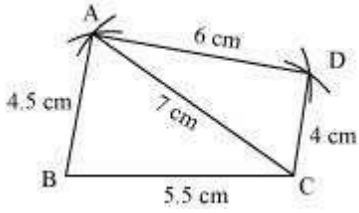
(1) ΔABC can be constructed by using the given measurements asfollows.



(2) Vertex D is 6 cm away from vertex A. Therefore, while taking A as centre, draw an arc of radius 6 cm.

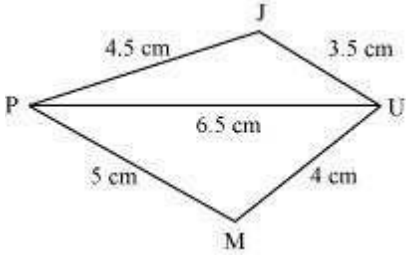


(3) TakingCascentre,drawanarcofradius4cm,cuttingthepreviousarcatpoint D. Join D to A and C.

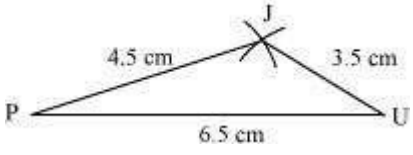


ABCD is the required quadrilateral.

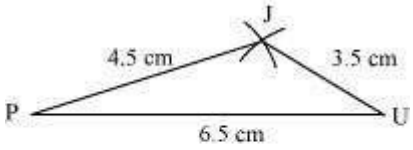
(ii) Firstly, a rough sketch of this quadrilateral can be drawn asfollows.



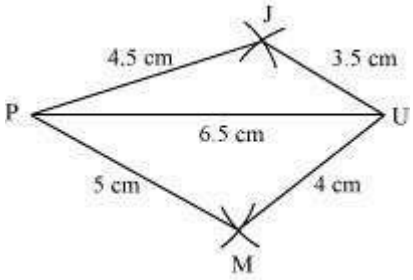
(1) Δ JUP can be constructed by using the given measurements asfollows.



(2) Vertex M is 5 cm away from vertex P and 4 cm away from vertex U. Taking P and U as centres, draw arcs of radii 5 cm and 4 cm respectively. Let the point of intersection be M.



(3) Join M to P andU.

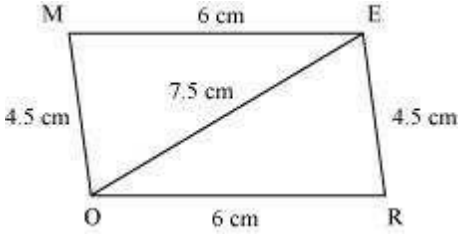


JUMP is the required quadrilateral.

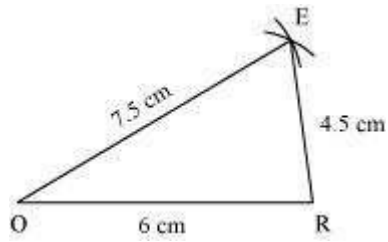
(iii) We know that opposite sides of a parallelogram are equal in length and also these are parallel to each other.

Hence, ME = OR, MO = ER

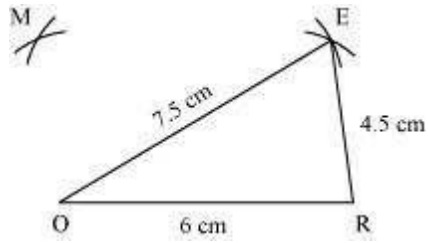
A rough sketch of this parallelogram can be drawn as follows.



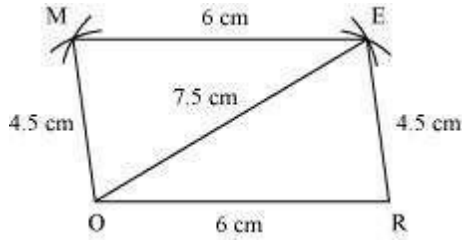
(1) Δ EOR can be constructed by using the given measurements asfollows.



(2) Vertex M is 4.5 cm away from vertex O and 6 cm away from vertex E. Therefore, while taking O and E as centres, draw arcs of 4.5 cm radius and 6 cm radius respectively. These will intersect each other at pointM.



(3) Join M to O andE.

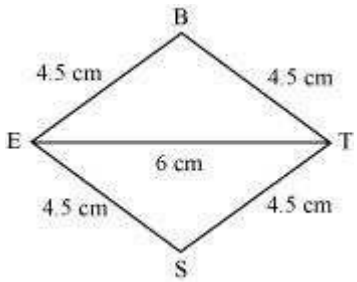


MORE is the required parallelogram.

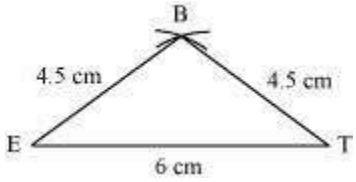
(iv) We know that all sides of a rhombus are of the same measure. Hence,

BE = ES = ST =TB

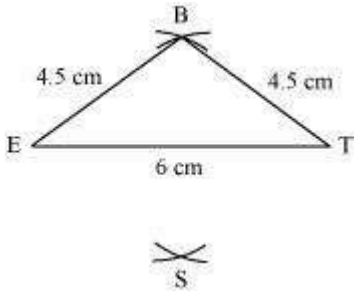
A rough sketch of this rhombus can be drawn as follows.



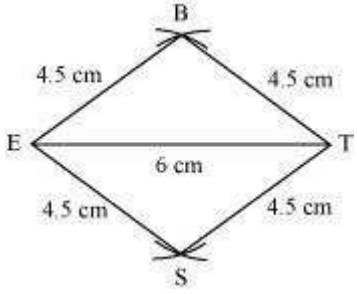
(1) Δ BET can be constructed by using the given measurements asfollows.



(2) Vertex S is 4.5 cm away from vertex E and also from vertex T. Therefore, while taking E and T as centres, draw arcs of 4.5 cm radius, which will be intersecting each other at point S.



(3) Join S to E andT.



BEST is the required rhombus.

Exercise 4.2

Question 1:

Construct the following quadrilaterals.

(i) QuadrilateralLIFT LI

= 4cm

IF = 3 cm TL

= 2.5 cm LF =

4.5cm

IT = 4 cm

(ii) QuadrilateralGOLD OL

= 7.5cm

GL = 6 cm GD

= 6 cm LD = 5

cm OD = 10

cm

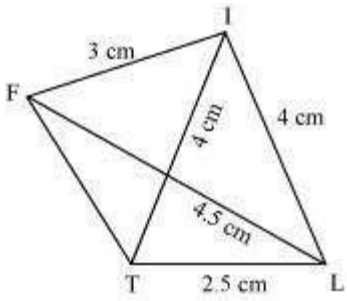
(iii) RhombusBEND

BN = 5.6cm

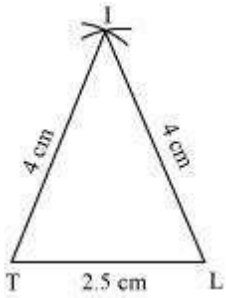
DE = 6.5 cm

Answer:

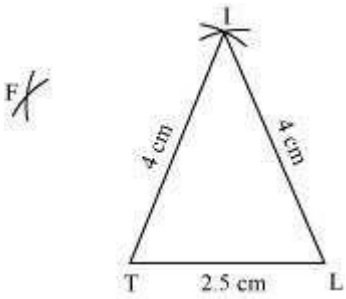
(i) A rough sketch of this quadrilateral can be drawn asfollows.



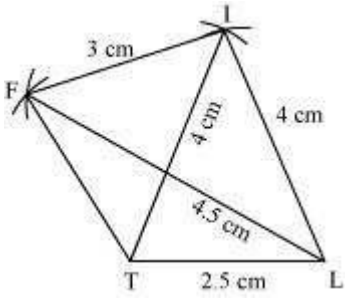
(1) Δ ITL can be constructed by using the given measurements asfollows.



(2) Vertex F is 4.5 cm away from vertex L and 3 cm away from vertex I. Therefore, while taking L and I as centres, draw arcs of 4.5 cm radius and 3 cm radius respectively, which will be intersecting each other at pointF.

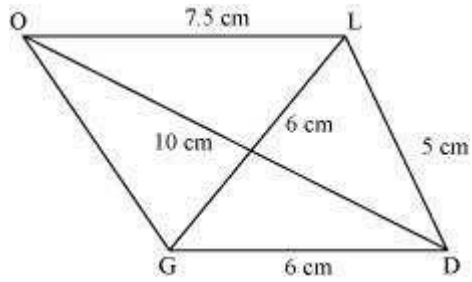


(3) Join F to T and F toI.

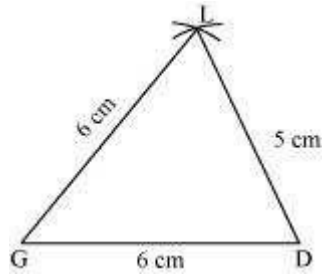


LIFT is the required quadrilateral.

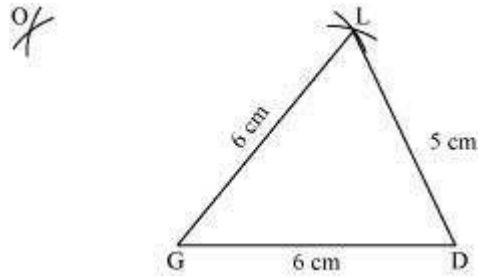
(ii) A rough sketch of this quadrilateral can be drawn asfollows.



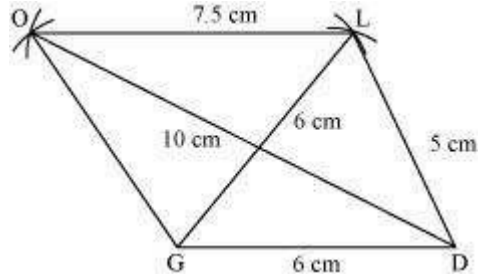
(1) Δ GDL can be constructed by using the given measurements asfollows.



(2) Vertex O is 10 cm away from vertex D and 7.5 cm away from vertex L. Therefore, while taking D and L as centres, draw arcs of 10 cm radius and 7.5 cm radius respectively. These will intersect each other at pointO.



(3) Join O to G andL.

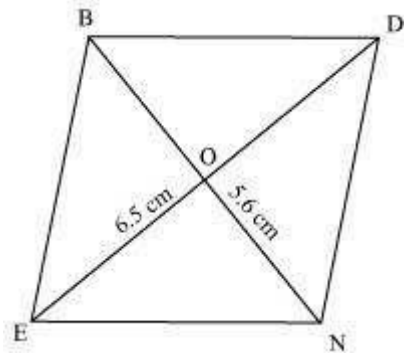


GOLD is the required quadrilateral.

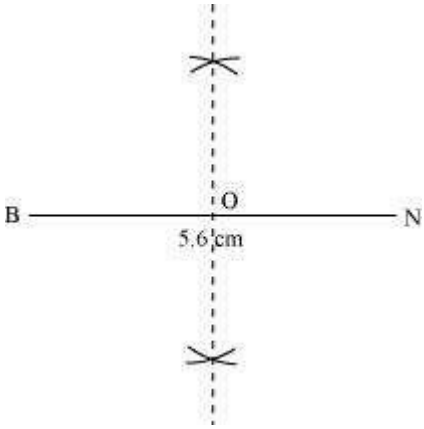
(iii) We know that the diagonals of a rhombus always bisect each other at 90º. Let us assume that these are intersecting each other at point O in thisrhombus.

Hence, EO = OD = 3.25 cm

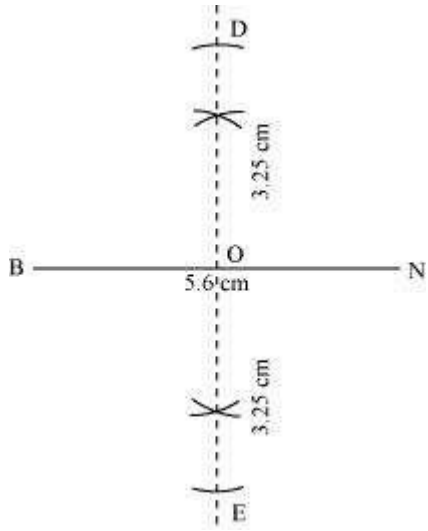
A rough sketch of this rhombus can be drawn as follows.



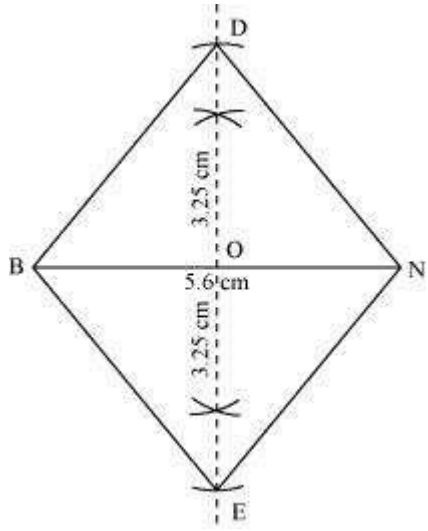
(1) Draw a line segment BN of 5.6 cm and also draw its perpendicular bisector. Let it intersect the line segment BN at pointO.



(2) Taking O as centre, draw arcs of 3.25 cm radius to intersect the perpendicular bisector at point D andE.



(3) Join points D and E to points B andN.



BEND is the required quadrilateral.

Exercise 4.3

Question 1:

Construct the following quadrilaterals.

(i) QuadrilateralMORE

MO = 6 cm

OR = 4.5 cm

∠M = 60°

∠O =105°

∠R =105°

(ii) Quadrilateral PLAN

PL = 4cm

LA = 6.5 cm

∠P = 90°

∠A = 110°

∠N = 85°

(iii) ParallelogramHEAR

HE = 5 cm

EA = 6 cm

∠R = 85°

(iv) Rectangle OKAY

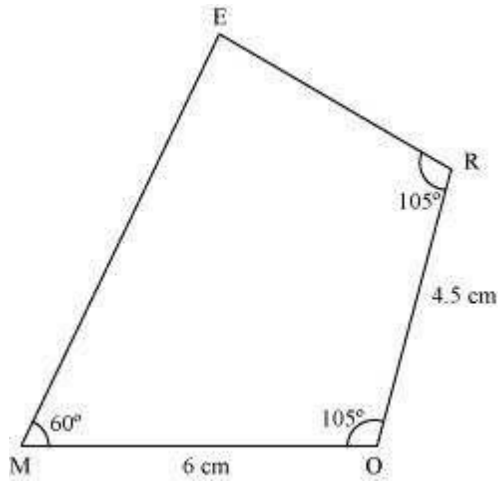
OK = 7cm

KA = 5 cm

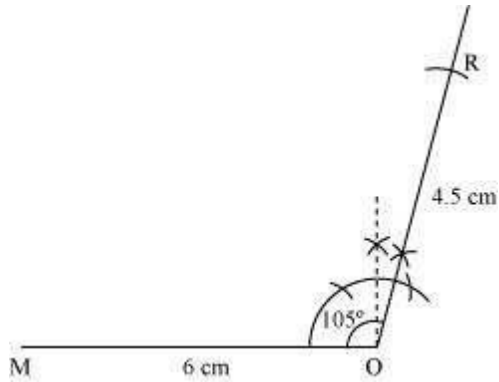
Answer:

(i)

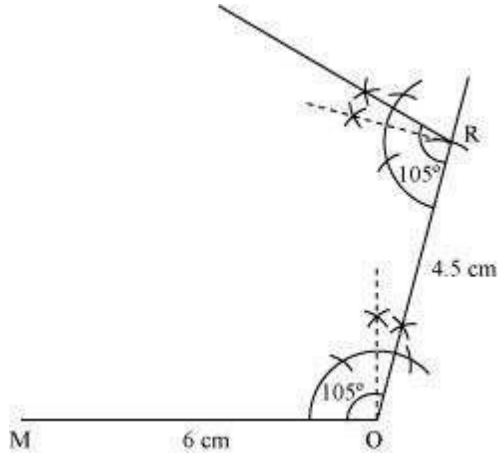
(1) A rough sketch of this quadrilateral can be drawn asfollows.



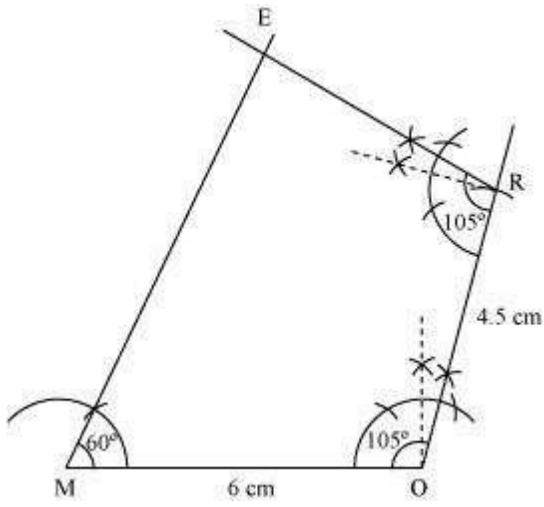
(2) DrawalinesegmentMOof6cmandanangleof105ºatpointO.AsvertexRis 4.5 cm away from the vertex O, cut a line segment OR of 4.5 cm from this ray.



(3) Again, draw an angle of 105º at pointR.



(4) Draw an angle of 60° at point M. Let this ray meet the previously drawn ray from R at pointE.



MORE is the required quadrilateral.

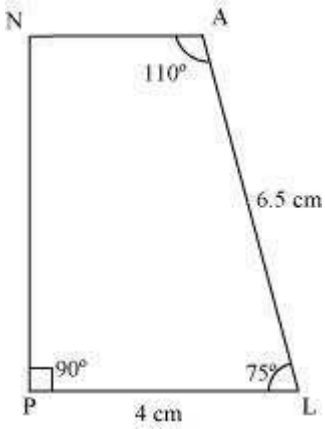
(ii)

(1) The sum of the angles of a quadrilateral is 360°. In quadrilateral PLAN, ∠P + ∠L + ∠A + ∠N = 360° 90° + ∠L + 110° + 85° =360°

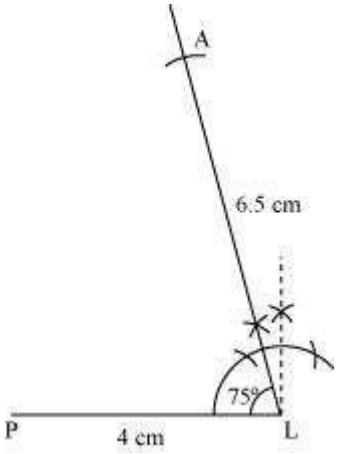
285° + ∠L = 360°

∠L = 360° − 285° = 75°

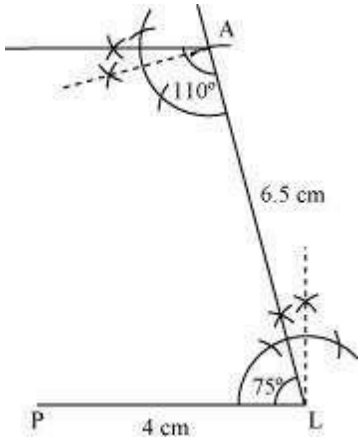
(2) A rough sketch of this quadrilateral is asfollows.



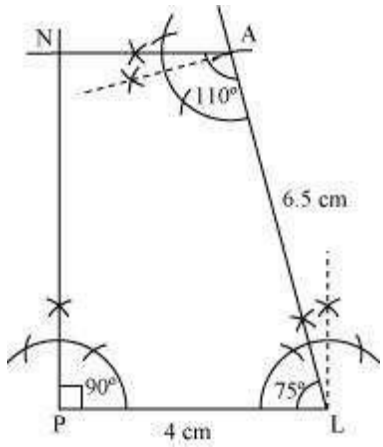
(3) Draw a line segment PL of 4 cm and draw an angle of 75º at point L. As vertex A is 6.5 cm away from vertex L, cut a line segment LA of 6.5 cm from thisray.



(4) Again draw an angle of 110º at pointA.



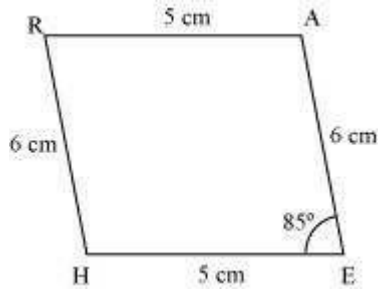
(5) Draw an angle of 90º at point P. This ray will meet the previously drawn ray from A at pointN.



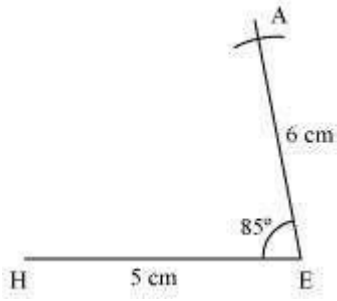
PLAN is the required quadrilateral.

(iii)

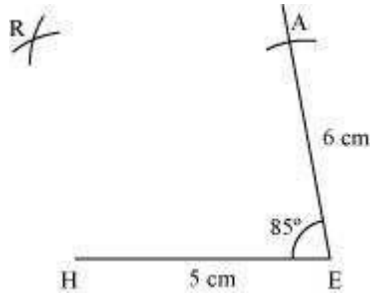
(1) Firstly, a rough sketch of this quadrilateral is asfollows.



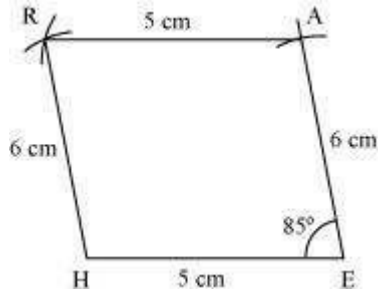
(2) Draw a line segment HE of 5 cm and an angle of 85º at point E. As vertex A is 6 cm away from vertex E, cut a line segment EA of 6 cm from thisray.



(3) Vertex R is 6 cm and 5 cm away from vertex H and A respectively. By taking radius as 6 cm and 5 cm, draw arcs from point H and A respectively. These will be intersecting each other at pointR.

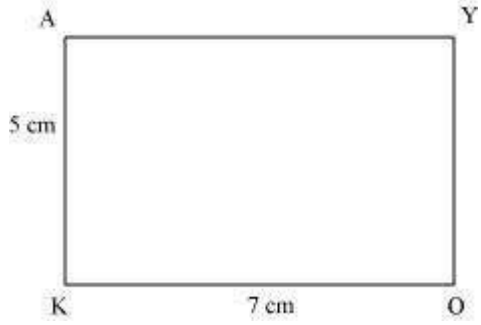


4. Join R to H and A.

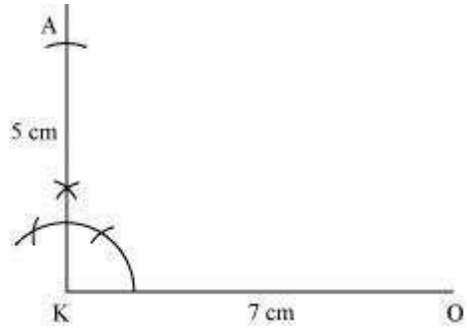


HEAR is the required quadrilateral. (iv)

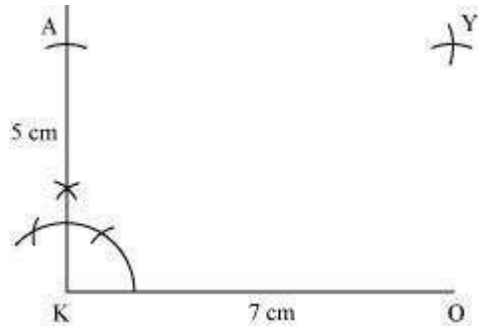
(1) A rough sketch of this quadrilateral is drawn asfollows.



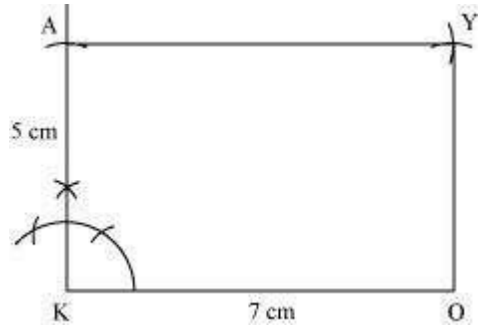
(2) Draw a line segment OK of 7 cm and an angle of 90º at point K. As vertex A is 5 cm away from vertex K, cut a line segment KA of 5 cm from thisray.



(3) Vertex Y is 5 cm and 7 cm away from vertex O and A respectively. By taking radius as 5 cm and 7 cm, draw arcs from point O and A respectively. These will be intersecting each other at pointY.



(4) Join Y to A andO.



OKAY is the required quadrilateral.

Exercise 4.4

Question 1:

Construct the following quadrilaterals,

(i) QuadrilateralDEAR

DE = 4cm

EA = 5 cm AR

= 4.5 cm

∠E =60°

∠A =90°

(ii) Quadrilateral TRUE

TR = 3.5cm

RU = 3 cm

UE = 4 cm

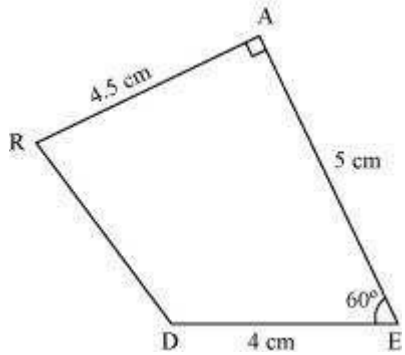
∠R = 75°

∠U = 120°

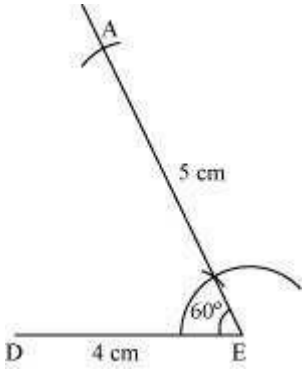
Answer:

(i)

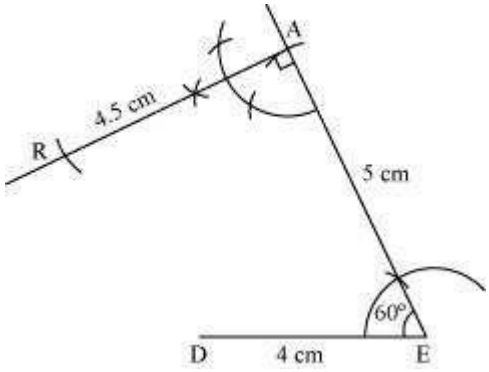
(1) A rough sketch of this quadrilateral can be drawn asfollows.



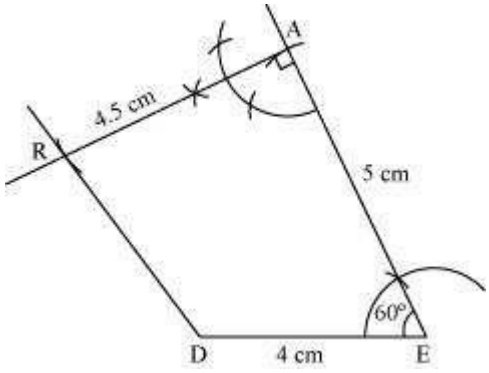
(2) Draw a line segment DE of 4 cm and an angle of 60º at point E. As vertex A is 5 cm away from vertex E, cut a line segment EA of 5 cm from thisray.



(3) Again draw an angle of 90° at point A. As vertex R is 4.5 cm away from vertex A, cut a line segment RA of 4.5 cm from thisray.

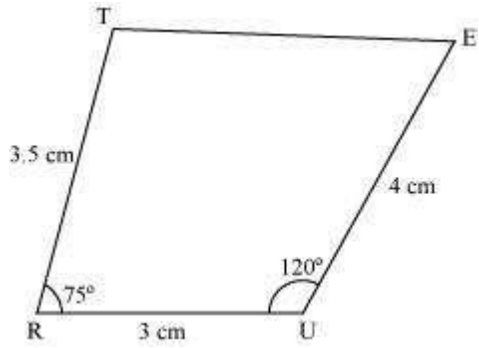


(4) Join D toR.

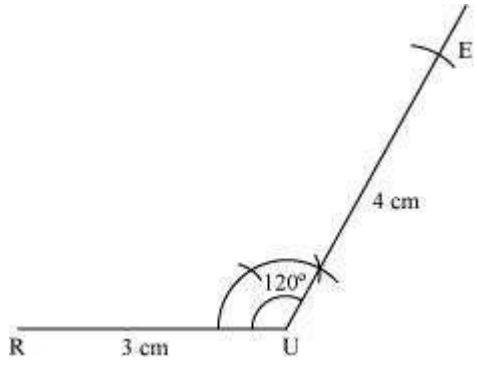


DEAR is the required quadrilateral. (ii)

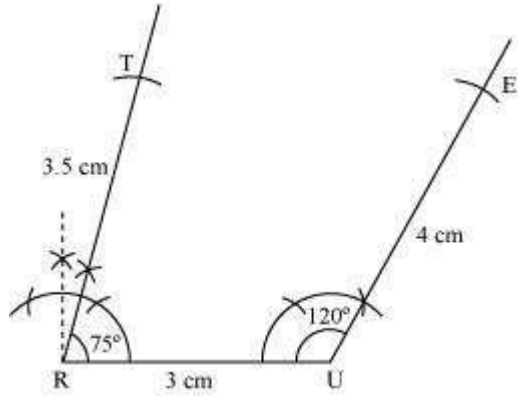
(1) A rough sketch of this quadrilateral can be drawn asfollows.



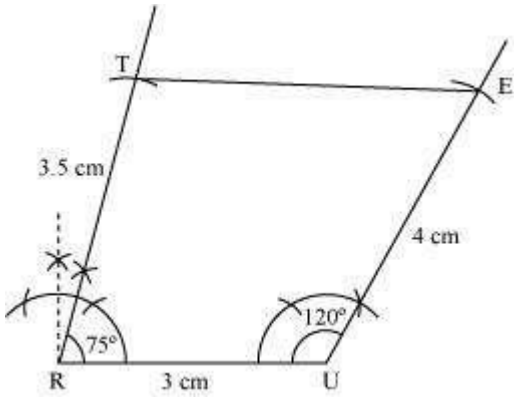
(2) Draw a line segment RU of 3 cm and an angle of 120° at point U. As vertex E is 4 cm away from vertex U, cut a line segment UE of 4 cm from thisray.



(3) Next, draw an angle of 75° at point R. As vertex T is 3.5 cm away from vertex R, cut a line segment RT of 3.5 cm from thisray.



(4) Join T toE.



TRUE is the required quadrilateral.

Exercise 4.5

Question 1:

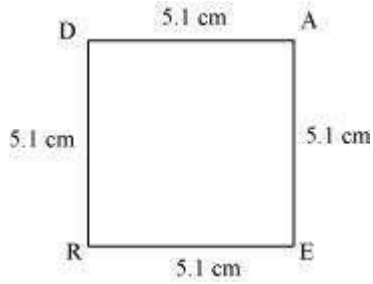
Draw the following:

The square READ with RE = 5.1 cm

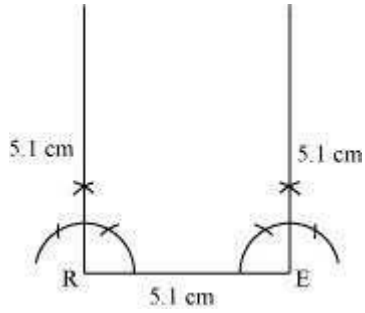
Answer:

All the sides of a square are of the same measure and also all the interior angles of a square are of 90º measure. Therefore, the given square READ can be drawn as follows.

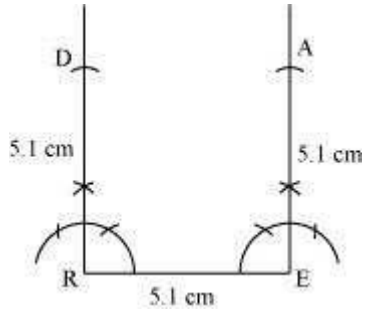
(1) A rough sketch of this square READ can be drawn asfollows.



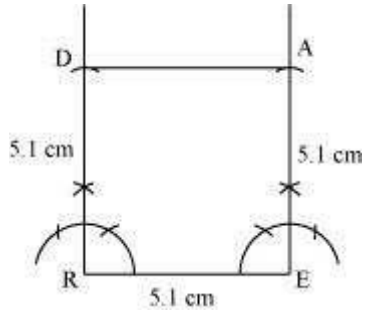
(2) Draw a line segment RE of 5.1 cm and an angle of 90º at point R andE.



(3) As vertex A and D are 5.1 cm away from vertex E and R respectively, cut line segments EA and RD, each of 5.1 cm from theserays.



(4) Join D toA.



READ is the required square.

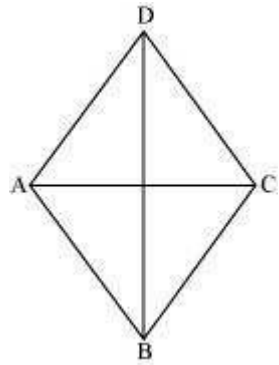
Question 2:

Draw the following:

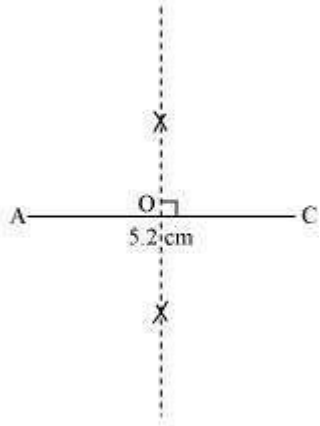
A rhombus whose diagonals are 5.2 cm and 6.4 cm long. Answer:

In a rhombus, diagonals bisect each other at 90º. Therefore, the given rhombus ABCD can be drawn as follows.

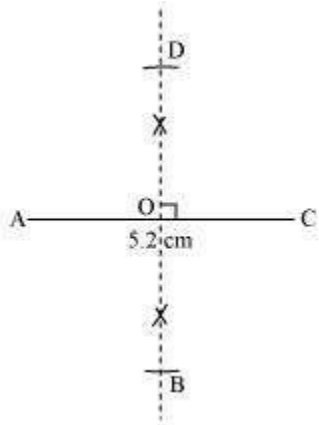
(1) A rough sketch of this rhombus ABCD is asfollows.



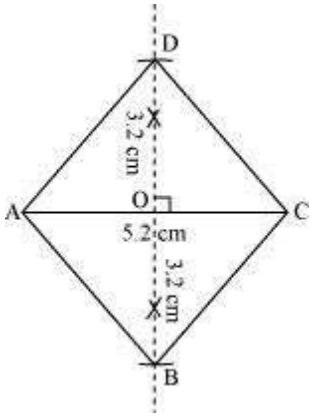
(2) Draw a line segment AC of 5.2 cm and draw its perpendicular bisector. Let it intersect the line segment AC at pointO.



(3) Drawarcsof $\frac{6.4 \text{ cm}}{2} = 3.2 \text{ cm}$ on both sides of this perpendicular bisector. Let the arcs intersect the perpendicular bisector at point B andD.



(4) Join points B and D with points A andC.



ABCD is the required rhombus.

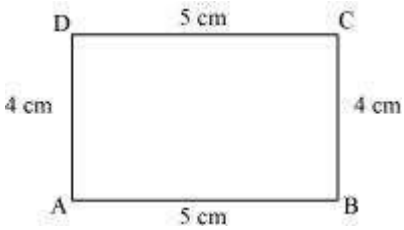
Question 3:

Draw the following:

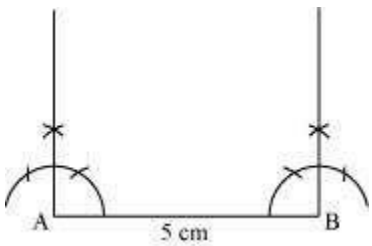
A rectangle with adjacent sides of length 5 cm and 4 cm. Answer:

Opposite sides of a rectangle have their lengths of same measure and also, all the interior angles of a rectangle are of 90º measure. The given rectangle ABCD may be drawn as follows.

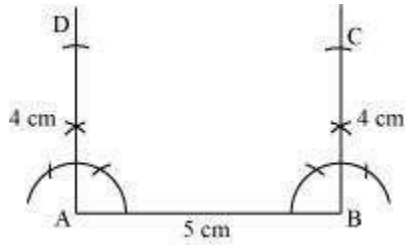
(1) A rough sketch of this rectangle ABCD can be drawn asfollows.



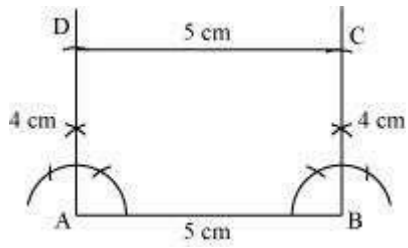
(2) Draw a line segment AB of 5 cm and an angle of 90º at point A andB.



(3) As vertex C and D are 4 cm away from vertex B and A respectively, cut line segments AD and BC, each of 4 cm, from theserays.



(4) Join D toC.



ABCD is the required rectangle.

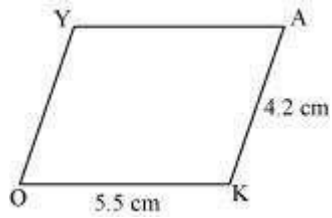
Question 4:

Draw the following:

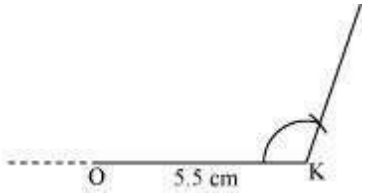
A parallelogram OKAY where OK = 5.5 cm and KA = 4.2 cm. Answer:

Opposite sides of a parallelogram are equal and parallel to each other. The given parallelogram OKAY can be drawn as follows.

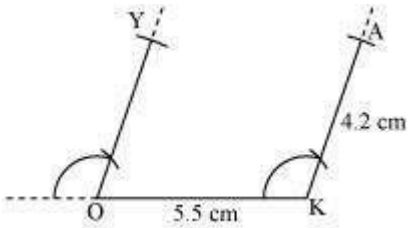
(1) A rough sketch of this parallelogram OKAY is drawn asfollows.



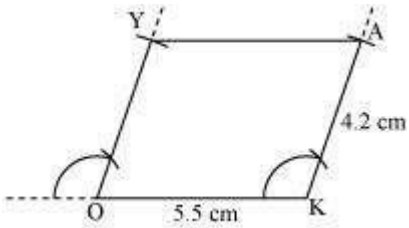
(2) Draw a line segment OK of 5.5 cm and a ray at point K at a convenientangle.



(3) Draw a ray at point O parallel to the ray at K. As the vertices, A and Y, are 4.2 cm away from the vertices K and O respectively, cut line segments KA and OY, each of 4.2 cm, from theserays.



(4) Join Y toA.



OKAY is the required rectangle.

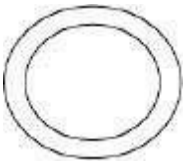
Exercise 3.1

Question 1:

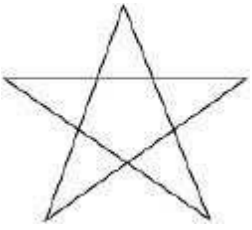
Given here are some figures.

(1)

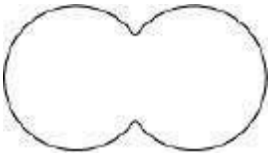
(2)



(3)

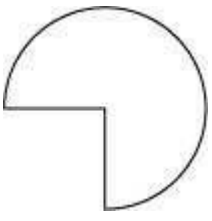


(4)

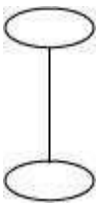


(5)

(6)



(7)



(8)

Classify each of them on the basis of the following.

(a) Simplecurve

(b) Simple closedcurve

(c) Polygon

(d) Convexpolygon

(e) Concavepolygon

Answer:

(a) 1, 2, 5, 6, 7

(b) 1, 2, 5, 6, 7

(c) 1, 2

(d) 2

(e) 1

Question 2:

How many diagonals does each of the following have?

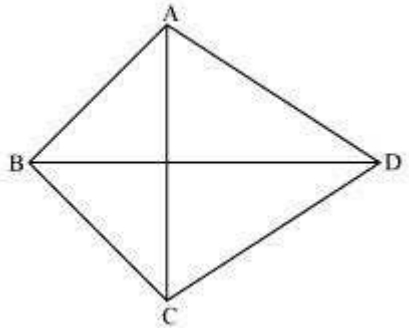
(a) A convex quadrilateral

(b) A regularhexagon

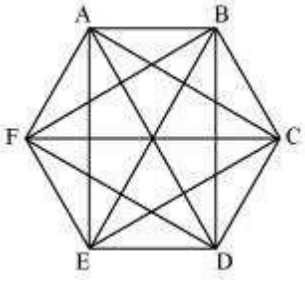
(c) A triangle

Answer:

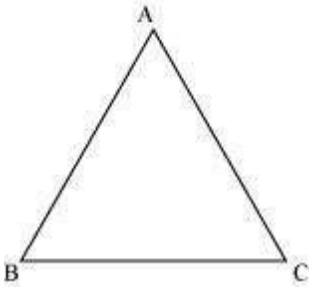
(a) There are 2 diagonals in a convexquadrilateral.



(b) There are 9 diagonals in a regularhexagon.



(c) A triangle does not have any diagonal init.

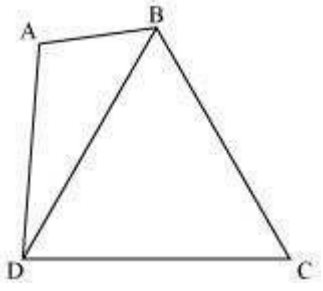


Question 3:

What is the sum of the measures of the angels of a convex quadrilateral? Will this property hold if the quadrilateral is not convex? (Make a non-convex quadrilateral andtry!)

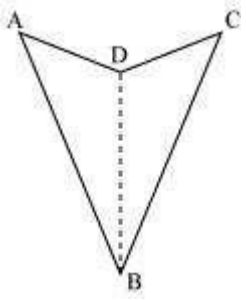
Answer:

The sum of the measures of the angles of a convex quadrilateral is 360° as a convex quadrilateral is made of two triangles.



Here, ABCD is a convex quadrilateral, made of two triangles ΔABD and ΔBCD. Therefore, the sum of all the interior angles of this quadrilateral will be same as the sum of all the interior angles of these two triangles i.e., 180º + 180º = 360º

Yes, this property also holds true for a quadrilateral which is not convex. This is because any quadrilateral can be divided into two triangles.

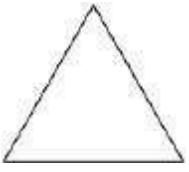
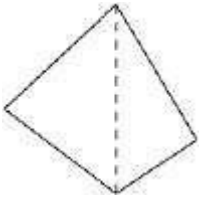
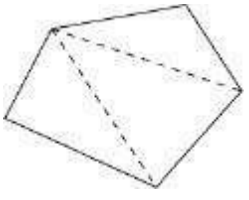
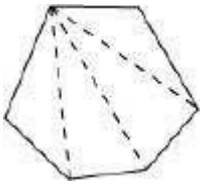


Here again, ABCD is a concave quadrilateral, made of two triangles ΔABD and ΔBCD. Therefore, sum of all the interior angles of this quadrilateral will also be 180º + 180º

= 360º

Question 4:

Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4	5	6
Angle sum	180°	2 ×180° = (4 − 2) × 180°	3 × 180° = (5 − 2) × 180°	4 ×180° = (6 − 2) × 180°

What can you say about the angle sum of a convex polygon with number of sides?

(a) 7

(b) 8

(c) 10

(d) *n*

Answer:

From the table, it can be observed that the angle sum of a convex polygon of n sides is $(n-2) \times 180^\circ$. Hence, the angle sum of the convex polygons having number of sides as above will be as follows.

(a) $(7 - 2) \times 180^\circ = 900^\circ$

(b) $(8 - 2) \times 180^\circ = 1080^\circ$

(c) $(10 - 2) \times 180^\circ = 1440^\circ$

(d) $(n - 2) \times 180^\circ$

Question 5:

What is a regular polygon?

State the name of a regular polygon of

(i) 3sides

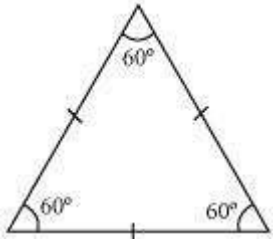
(ii) 4sides

(iii) 6 sides

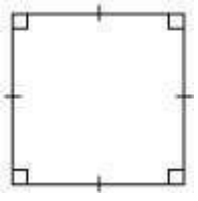
Answer:

A polygon with equal sides and equal angles is called a regular polygon.

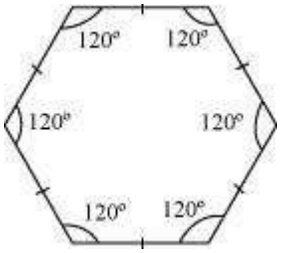
(i) EquilateralTriangle



(ii) Square

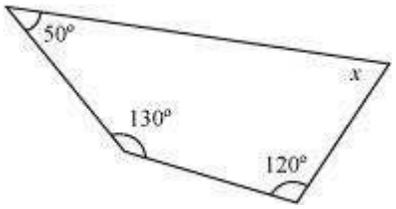


(iii) RegularHexagon

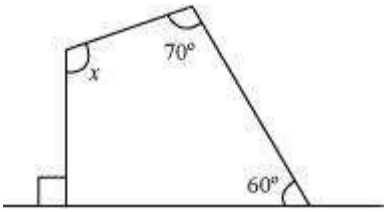


Question 6:

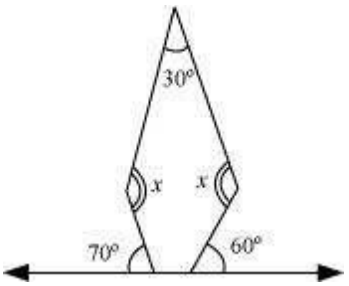
Find the angle measure x in the following figures.



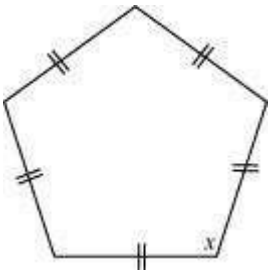
(a)



(b)



(c)



(d)

Answer:

(a)

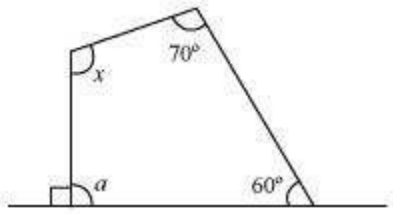
Sum of the measures of all interior angles of a quadrilateral is 360º. Therefore, in the given quadrilateral,

$50° + 130° + 120° + x = 360°$

$300° + x = 360°$

$x = 60°$

(b)



From the figure, it can be concluded that, 90º +

a = 180º (Linear pair)

a = 180º − 90º = 90º

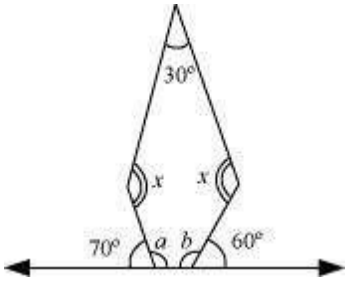
Sum of the measures of all interior angles of a quadrilateral is 360º. Therefore, in the given quadrilateral,

60° + 70° + x + 90° = 360°

220° + x = 360°

x = 140°

(c)



From the figure, it can be concluded that, 70 + a

= 180° (Linear pair)

a = 110°

60° + b = 180° (Linear pair)

b = 120°

Sum of the measures of all interior angles of a pentagon is 540º.

Therefore, in the given pentagon,

120° + 110° + 30° + x + x = 540°

260° + 2x = 540°

2x = 280°

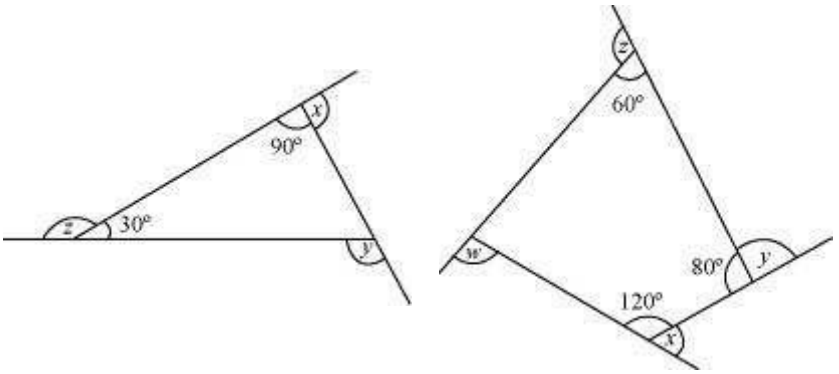
$x = 140°$

(d)

Sum of the measures of all interior angles of a pentagon is 540º. $5x = 540°$

$x = 108°$

Question 7:



(a) find $x + y + z$

(b) find $x + y + z + w$

Answer:

(a) $x + 90° = 180°$ (Linear pair)

$x = 90°$

$z + 30° = 180°$ (Linear pair)

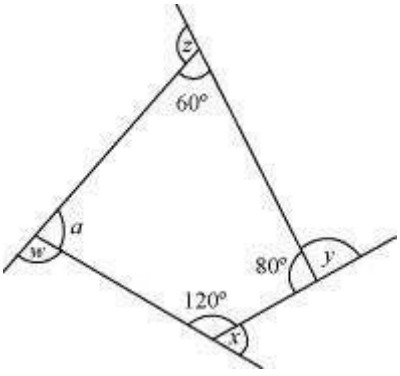
$z = 150°$

$y = 90° + 30°$ (Exterior angle theorem)

$y = 120°$

$x + y + z = 90° + 120° + 150° = 360°$

(b)



Sum of the measures of all interior angles of a quadrilateral is 360º. Therefore, in the given quadrilateral,

$a + 60° + 80° + 120° = 360°$

$a + 260° = 360°$

$a = 100°$

$x + 120° = 180°$ (Linear pair)

$x = 60°$

$y + 80° = 180°$ (Linear pair)

$y = 100°$

$z + 60° = 180°$ (Linear pair)

$z = 120°$

$w + 100° = 180°$ (Linear pair)

$w = 80°$

Sum of the measures of all interior angles = $x + y + z + w$

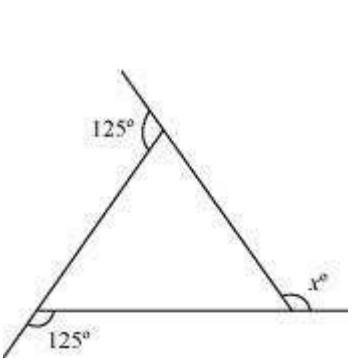
$= 60° + 100° + 120° + 80°$

$= 360°$

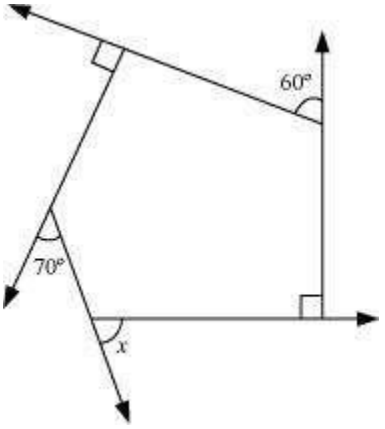
Exercise 3.2

Question 1:

Find x in the following figures.



(a)



(b)

Answer:

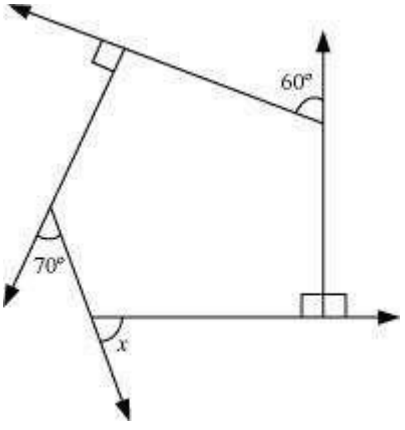
We know that the sum of all exterior angles of any polygon is 360º. (a) 125° +

125° + x = 360°

250° + x = 360°

x = 110°

(b)



60° + 90° + 70° + x + 90° = 360°

310° + x = 360°

x = 50°

Question 2:

Find the measure of each exterior angle of a regular polygon of

(i) 9sides

(ii) 15 sides

Answer:

(i) Sum of all exterior angles of the given polygon =360º

Each exterior angle of a regular polygon has the same measure. Thus,

measure of each exterior angle of a regular polygon of 9 sides

$= \frac{360°}{9} = 40°$

(ii) Sum of all exterior angles of the given polygon =360º

Each exterior angle of a regular polygon has the same measure. Thus, measure

of each exterior angle of a regular polygon of 15sides

$= \frac{360°}{15} = 24°$

Question 3:

How many sides does a regular polygon have if the measure of an exterior angle is 24°?

Answer:

Sum of all exterior angles of the given polygon = 360º

Measure of each exterior angle = 24º

Thus, number of sides of the regular polygon $= \frac{360°}{24°} = 15$

Question 4:

How many sides does a regular polygon have if each of its interior angles is 165°? Answer:

Measure of each interior angle = 165°

Measure of each exterior angle = 180° − 165° = 15°

The sum of all exterior angles of any polygon is 360º.

Thus, number of sides of the polygon $= \frac{360°}{15°} = 24$

Question 5:

(a) Is it possible to have a regular polygon with measure of each exterior angle as 22°?

(b) Can it be an interior angle of a regular polygon? Why? Answer:

The sum of all exterior angles of all polygons is 360º. Also, in a regular polygon, each exterior angle is of the same measure. Hence, if 360º is a perfect multiple of the given exterior angle, then the given polygon will bepossible.

(a) Exterior angle =22°

360º is not a perfect multiple of 22º. Hence, such polygon is not possible.

(b) Interior angle =22°

Exterior angle = 180° − 22° = 158°

Such a polygon is not possible as 360° is not a perfect multiple of 158°.

Question 6:

(a) What is the minimum interior angle possible for a regularpolygon?

(b) What is the maximum exterior angel possible for a regular polygon? Answer:

Consider a regular polygon having the lowest possible number of sides (i.e., an equilateral triangle). The exterior angle of this triangle will be the maximum exterior angle possible for any regularpolygon.

Exterior angle of an equilateraltriangle $= \frac{360°}{3} = 120°$

Hence, maximum possible measure of exterior angle for any polygon is 120º. Also, we know that an exterior angle and an interior angle are always in a linear pair.

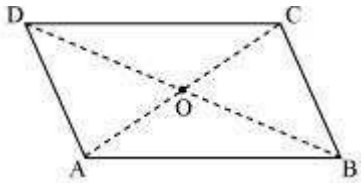
Hence, minimum interior angle = 180º − 120° = 60º

Exercise 3.3

Question 1:

Given a parallelogram ABCD. Complete each statement along with the definition or property used.

(i) AD =…



(ii) ∠DCB =…

(iii) OC =…

(iv) $m\angle DAB + m\angle CDA$ = …

Answer:

(i) In a parallelogram, opposite sides are equal inlength.

AD = BC

(ii) In a parallelogram, opposite angles are equal inmeasure.

∠DCB = ∠DAB

(iii) In a parallelogram, diagonals bisect each other.

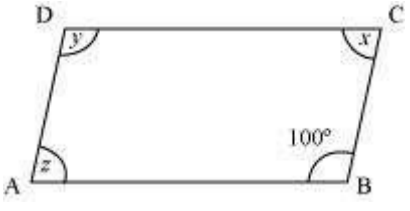
Hence, OC = OA

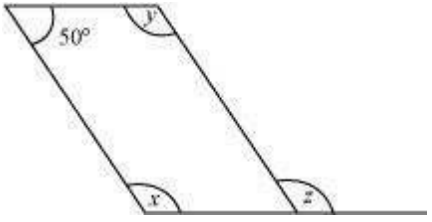
(iv) In a parallelogram, adjacent angles are supplementary to each other. Hence,

$m\angle DAB + m\angle CDA = 180°$

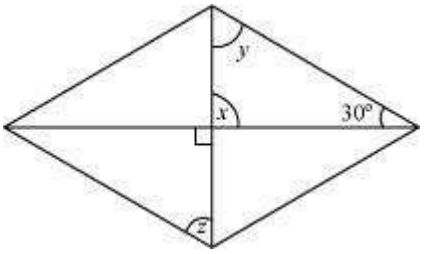
Question 2:

Consider the following parallelograms. Find the values of the unknowns *x*, *y*, *z*.

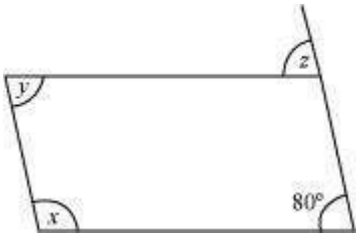




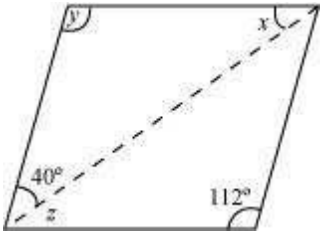
(i)



(ii)



(iii)



(iv)

(v)

Answer:

(i) $x + 100° = 180°$ (Adjacent angles aresupplementary)

$x = 80°$

$z = x = 80°$(Opposite angles are equal)

$y = 100°$ (Opposite angles are equal)

(ii) $50° + y = 180°$ (Adjacent angles aresupplementary)

$y = 130°$

$x = y = 130°$ (Opposite angles are equal)

$z = x = 130°$ (Corresponding angles)

(iii) $x = 90°$ (Vertically oppositeangles)

$x + y + 30° = 180°$ (Angle sum property of triangles) $120° + y = 180°$

$y = 60°$

$z = y = 60°$ (Alternate interior angles)

(iv) $z = 80°$ (Correspondingangles)

$y = 80°$ (Opposite angles are equal)

$x + y = 180°$ (Adjacent angles are supplementary)

$x = 180° - 80° = 100°$

(v) $y = 112°$ (Opposite angles are equal)

$x + y + 40° = 180°$ (Angle sum property of triangles)

$x + 112° + 40° = 180°$

$x + 152° = 180°$

$x = 28°$

$z = x = 28°$ (Alternate interior angles)

Question 3:

Can a quadrilateral ABCD be a parallelogram if (i) $\angle D + \angle B = 180°$?

(ii) AB = DC = 8 cm, AD = 4 cm and BC = 4.4cm?

(iii) $\angle A = 70°$ and $\angle C = 65°$?

Answer:

(i) For $\angle D + \angle B = 180°$, quadrilateral ABCD may or may not be a parallelogram. Along with this condition, the following conditions should also befulfilled.

The sum of the measures of adjacent angles should be 180º.

Opposite angles should also be of same measures.

(ii) No. Opposite sides AD and BC are of differentlengths.

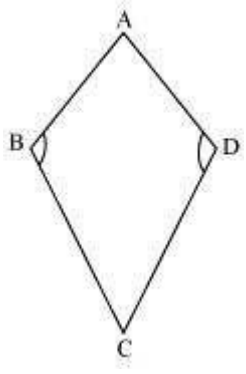
(iii) No. Opposite angles A and C have differentmeasures.

Question 4:

Draw a rough figure of a quadrilateral that is not a parallelogram but has exactly two opposite angles of equal measure.

Answer:

Here, quadrilateral ABCD (kite) has two of its interior angles, $\angle B$ and $\angle D$, of same measures. However, still the quadrilateral ABCD is not a parallelogram as the measures of the remaining pair of opposite angles, $\angle A$ and $\angle C$, are not equal.



Question 5:

The measures of two adjacent angles of a parallelogram are in the ratio 3:2. Find the measure of each of the angles of the parallelogram.

Answer:

Let the measures of two adjacent angles, ∠A and ∠B, of parallelogram ABCD are in the ratio of 3:2. Let ∠A = 3x and ∠B = 2x

We know that the sum of the measures of adjacent angles is 180º for a parallelogram.

∠A + ∠B = 180º 3x +

2x = 180º

5x = 180º

$$x = \frac{180^\circ}{5} = 36^\circ$$

∠A = ∠C = 3x = 108º (Opposite angles)

∠B = ∠D = 2x = 72º (Opposite angles)

Thus, the measures of the angles of the parallelogram are 108º, 72º, 108º, and 72º.

Question 6:

Two adjacent angles of a parallelogram have equal measure. Find the measure of each of the angles of the parallelogram.

Answer:

Sum of adjacent angles = 180°

∠A + ∠B = 180º

2∠A = 180º (∠A = ∠B)

∠A = 90º

∠B = ∠A = 90º

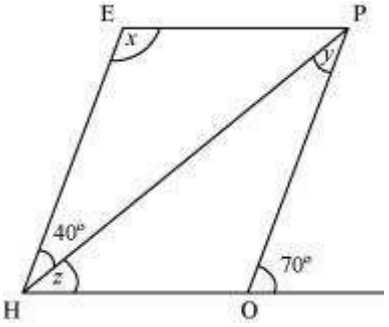
∠C = ∠A = 90º (Oppositeangles)

∠D = ∠B = 90º (Oppositeangles)

Thus, each angle of the parallelogram measures 90º.

Question 7:

The adjacent figure HOPE is a parallelogram. Find the angle measures *x*, *y* and *z*. State the properties you use to find them.



Answer:

y = 40° (Alternate interior angles) 70° = *z* +

40º (Corresponding angles) 70° − 40° =*z*

z = 30°

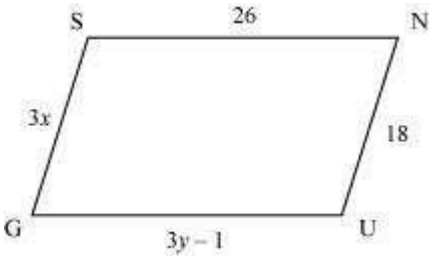
x + (*z* + 40º) = 180° (Adjacent pair of angles)

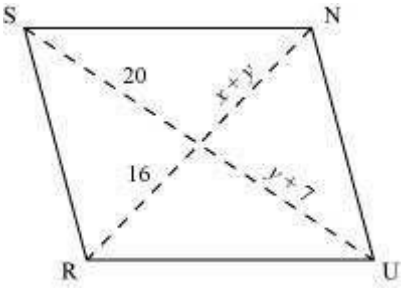
x + 70º = 180°

x = 110°

Question 8:

The following figures GUNS and RUNS are parallelograms. Find *x* and *y*. (Lengths are in cm)





(i) (ii)

Answer:

(i)We know that the lengths of opposite sides of a parallelogram are equal to each other.

GU = SN

$3y - 1 = 26$

$3y = 27$

$y = 9$ SG =

NU $3x$

$= 18$

$x = 6$

Hence, the measures of x and y are 6 cm and 9 cm respectively. (ii)We know that the diagonals of a parallelogram bisect each other. $y + 7 = 20$

$y = 13$

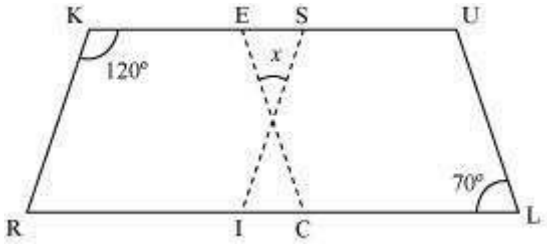
$x + y = 16$

$x + 13 = 16$

$x = 3$

Hence, the measures of x and y are 3 cm and 13 cm respectively.

Question 9:



In the above figure both RISK and CLUE are parallelograms. Find the value of *x*. Answer:

Adjacent angles of a parallelogram are supplementary. In

parallelogram RISK, ∠RKS + ∠ISK = 180°

120° + ∠ISK = 180°

∠ISK = 60°

Also, opposite angles of a parallelogram are equal. In

parallelogram CLUE, ∠ULC = ∠CEU = 70°

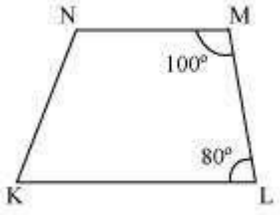
The sum of the measures of all the interior angles of a triangle is 180º.

x + 60° + 70° = 180°

x = 50°

Question 10:

Explain how this figure is a trapezium. Which of its two sides are parallel?



Answer:

If a transversal line is intersecting two given lines such that the sum of the measures of the angles on the same side of transversal is 180º, then the given two lines will be parallel to each other.

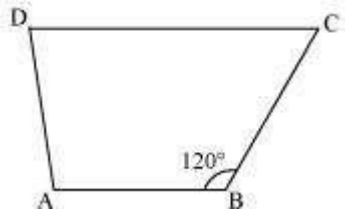
Here, ∠NML + ∠MLK = 180°

Hence,NM||LK

As quadrilateral KLMN has a pair of parallel lines, therefore, it is a trapezium.

Question 11:

Find $m\angle C$ in the following figure if $\overline{AB} \| \overline{DC}$



Answer:

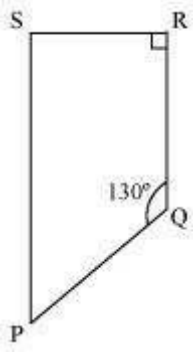
Given that, $\overline{AB} \| \overline{DC}$

$\angle B + \angle C = 180°$ (Angles on the same side of transversal) $120° + \angle C = 180°$

$\angle C = 60°$

Question 12:

Find the measure of $\angle P$ and $\angle S$,if $\overline{SP} \| \overline{RQ}$ in the following figure. (If you find $m\angle R$, is there more than one method to find $m\angle P$?)



Answer:

$\angle P + \angle Q = 180°$ (Angles on the same side of transversal)

$\angle P + 130° = 180°$

$\angle P = 50°$

$\angle R + \angle S = 180°$ (Angles on the same side of transversal) $90° + \angle R = 180°$

$\angle S = 90°$

Yes. There is one more method to find the measure of $m\angle P$.

$m\angle R$ and $m\angle Q$ are given. After finding $m\angle S$, the angle sum property of a quadrilateral can be applied to find $m\angle P$.

Exercise 3.4

Question 1:

State whether True or False.

(a) All rectangles aresquares.

(b) All rhombuses areparallelograms.

(c) All squares are rhombuses and also rectangles.

(d) All squares are notparallelograms.

(e) All kites arerhombuses.

(f) All rhombuses arekites.

(g) All parallelograms aretrapeziums.

(h) All squares are trapeziums.

Answer:

(a) False. All squares are rectangles but all rectangles are notsquares.

(b) True. Opposite sides of a rhombus are equal and parallel to eachother.

(c) True. All squares are rhombuses as all sides of a square are of equal lengths. All squares are also rectangles as each internal angle measures90°.

(d) False. All squares are parallelograms as opposite sides are equal andparallel.

(e) False. A kite does not have all sides of the samelength.

(f) True. A rhombus also has two distinct consecutive pairs of sides of equallength.

(g) True. All parallelograms have a pair of parallelsides.

(h) True. All squares have a pair of parallelsides.

Question 2:

Identify all the quadrilaterals that have

(a) four sides of equallength

(b) four right angles

Answer:

(a) Rhombus and Square are the quadrilaterals that have 4 sides of equallength.

(b) Square and rectangle are the quadrilaterals that have 4 rightangles.

Question 3:

Explain how a square is.

(i) aquadrilateral

(ii) aparallelogram

(iii) arhombus

(iv) a rectangle

Answer:

(i) A square is a quadrilateral since it has foursides.

(ii) A square is a parallelogram since its opposite sides are parallel to eachother.

(iii) A square is a rhombus since its four sides are of the samelength.

(iv) A square is a rectangle since each interior angle measures90°.

Question 4:

Name the quadrilaterals whose diagonals.

(i) bisect eachother

(ii) are perpendicular bisectors of eachother

(iii) are equal

Answer:

(i) The diagonals of a parallelogram, rhombus, square, and rectangle bisect each other.

(ii) The diagonals of a rhombus and square act as perpendicularbisectors.

(iii) The diagonals of a rectangle and square areequal.

Question 5:

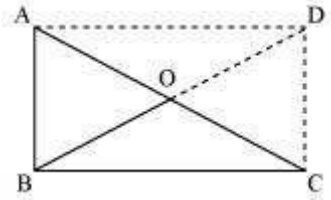
Explain why a rectangle is a convex quadrilateral.

Answer:

In a rectangle, there are two diagonals, both lying in the interior of the rectangle. Hence, it is a convex quadrilateral.

Question 6:

ABC is a right-angled triangle and O is the mid point of the side opposite to the right angle. Explain why O is equidistant from A, B and C. (The dotted lines are drawn additionally to help you).



Answer:

Draw lines AD and DC such

that AD||BC, AB||DC AD = BC,

AB = DC

ABCD is a rectangle as opposite sides are equal and parallel to each other

and all the interior angles are of 90º.

In a rectangle, diagonals are of equal length and also these

bisect each other. Hence, AO = OC = BO = OD

Thus, O is equidistant from A, B, and C.